FOOD MANUFACTURE

Vol. XXI, No. 5 May 1, 1946

World Food Shortage

LAST month the different aspects of world food shortage were described in the White Paper, issued on the eve of the Parliamentary Debate, which was based upon the data contained therein.

There was nothing much in the White Paper that was not already familiar, although it elaborates and summarises the matter. The world food shortage is likely to last until after the 1947-1948 harvest, and by next June the world would have consumed all those abnormal stocks of wheat which had been accumulated during the war, and we ourselves would have reduced our stocks to a level even below what had been deemed to be the minimum in peace-time, said Mr. Attlee, in opening the Debate. He expressed the pious hope that the world harvests this year would not fall below the average, but if they did the outlook would be black. The prospects of fat supplies were also not very reassuring.

The Debate was maintained on the level of the more fastidious ideals of Parliamentary procedure, although Mr. Hudson and Sir Arthur Salter hit hard at the White Paper.

Mr. Hudson complained that the Prime Minister dealt too cursorily with wheat production at home. He disagreed that the succession of droughts was the cause of today's critical situation, for the reason that bad harvests in some regions were offset by good ones in others. Faulty price-fixing was, in Mr. Hudson's opinion, the real reason for the shortage of wheat in the chief producing countries, as a result of which it paid farmers in the United States, to some extent those in Canada, and to a lesser extent those in the Argentine, to feed their wheat and grain to animals and sell the animal products and the wheat for making industrial products rather than to let it go for direct human consumption. The real remedy was to try and get the U.S. to agree to cut down the feeding of grain to animals. Another one was to try to get waste spaces cultivated.

Turning to fats, Mr. Hudson wanted to know what the facts really were. He stressed the figures for the fat shortage, which amounted to about a quarter of the total consumption. He asked the Government whether the onset of autumn and winter was the best time to reduce the fat ration, in the event of the failure of the gamble of finding a little more fat in the world.

Constructive in tone and balanced in argument was the contribution made by Sir John Boyd Orr. He expressed considerable hope that the forthcoming FAO conference to take place in Washington on May 20 in assessing the food position and the prospects for 1946-1947 and 1947-1948 would reach agreement on the measures to increase production. He also hoped that the advisability of co-ordinating the activities of existing organisations would be considered.

Fats and oils were the theme of Sir Frank Sanderson's speech. He thought that we should be told why we could not get cottonseed from Egypt. He also asked whether the Brazilian market for cottonseed had been fully investigated. He thought that it would be of great assistance to the House if they were given a White Paper setting forth the different oil seeds, with information as to the difficulties existing in the different countries in securing requirements.

Sir Arthur Salter was disappointed with the White Paper. He thought that it should have been published in the early autumn, when it would have had a very valuable effect on the situation. If the information then possessed by the Government had been divulged it was extremely likely that the rationing that ended then in America in particular would have been continued and the economies now being hastily organised might have been in effect during the winter.

Could the present crisis have been foreseen? is the question which naturally occurs. Surely, it has been asked, the fact of the increase in the population of India should have been noticed? The estimates of the European harvest were over-optimistic. The encouragement given to livestock farming has proved to be injudicious in the light of later events, but the picture was different when the decisions were taken.

All these considerations are negative, and it behoves us to examine them constructively. Everybody concerned has been shaken from complacency. To what extent can alleviation, if not remedies, be

applied? As FOOD MANUFACTURE announced last month the public is being urged to reduce consumption of bread; the extraction rate could be raised still further; cereals for brewing could be further curtailed. Many of these measures would be extremely unpopular. This argument also applies to possible action on the same lines by the U.S.A. and Canada.

At the time of going to press two important developments have taken place. The British Government has informed the Combined Food Board that it would ration bread in the United Kingdom if the United States would do the same. In addition to this, the whole nation will receive a "Save Food" appeal, the Prime Minister having written to civic heads and chairmen of Food Committees throughout the United Kingdom urging them to support the campaign.

The offer to ration bread was made after the Cabinet had examined the world grain situation in the light of a request from Mr. La Guardia, Director-General of UNRRA, that a special meeting of the Combined Food Board should be called to examine the situation, particularly in Italy, Poland, Greece, and Jugoslavia.

The epoch of hesitations is closing. If there is one thing that will bring home to everybody the acuteness of the position, it is bread rationing, the avoidance of which in this country up to now has been the pride of our legislators. The fight against famine is on.

Search For Fats

The world shortage of edible oils and fats, with searchings for supplies from a variety of sources, recalls the pre-1939 salvage drive in Germany and other countries dependent on considerable imports to make up the other 50 per cent. of total consumption. Oils from kernels, from linseed, poppy, and walnut were studied, and a call was made to grow sunflowers in allotments and gardens, the seeds of which furnish not only oil but an oil-cake when pressed. Grape-seed oil proved more successful when grapes were free from mildew, the seeds being suitable for drying and storing if not required immediately. Grape oil is practically colourless, slightly sweet, and somewhat resembles olive oil, provided hot-pressing is avoided and second-pressing oil is collected separately. Oil content may reach 15 per cent.; the pale, slightly sweet oil from pressing and the extracted oil of nutty flavour and yellow tint both being suitable for edible purposes (although cold creams and pharmaceuticals put in a claim for suitability). A German vine-growers' association, using plant subsidised by the government, showed what can be done in this pre-war phase of "living on leavings."

In Italy tomato pips when pressed and extracted yield "tomato oil" which, though regarded as a semi-drying oil, can be used in salads and in cooking as well as in varnishes and soap-making. Here again the pressed residue together with skins can be applied both as fodder and in fertilisers. Rapeseed oil and oil from other plants have been mooted as better propositions than sunflowers for home growing, particularly as sunflowers of the right type are more sensitive to soil conditions than was at first believed. Some idea of this German thoroughness in exploring every possibility is provided by a study of fat production from coffee grouts. When collected, dried, and extracted with benzine or similar solvent, as much as 12 per cent. of the weight is taken up, representing the bulk of oil content. Yet a further extraction provides another 10 per cent. fats, waxes, and resinous extracts useful in leather dressings and polishes. This latter salvage scheme is vitiated, of course, by difficulty in collecting; the only economic scheme seems to depend on collections from large hotels, restaurants, and canteens.

Nationalisation of Fishing Industry

A call for the nationalisation of the British fishing industry and the establishment in the north-east of Scotland of canning plants will be placed before the Labour Party Conference in June by Aberdeenshire Labour bodies. The proposals urge that the time is opportune to nationalise the fishing industry at the catching, curing, and distributing ends and also to control, by nationalisation, the ancillary industries of net-making, cold storage, manufacture of boxes, fish meal, and oil by-products. It is also urged that canneries be established all along the Moray Firth to take the surplus fish products from this area.

There has been a strong trend of opinion in the fishing industry itself that some reform is overdue in almost every sphere of activity to effect economy and efficiency. The problem has been rather to decide along which line this reform should operate. The suggestion of nationalisation may have the effect of encouraging a speedier move in the direction of internal reorganisation by the industry itself.

Soya Flour

Soya flour is the latest food product virtually to disappear from the market. An official of the Food Ministry states that supplies of soya beans in the hands of millers at the present time are very small and that further imports are unlikely to be received for some considerable time.

Before the war imports of soya beans came mainly from China, but since 1940 the United States have been the only source of supply. During the period of Lend-Lease, 15,000 tons were received from that country, but no shipments have been made since the resumption of dollar payments.

Soya flour has proved a valuable product to many food manufacturing industries during the

war, and specially processed flour from which the characteristic bitterness of soya beans has been removed is still being widely used in ice cream and other products. Manufacturers of these will probably have difficulty in obtaining further supplies, and the Ministry of Food is unable to foreshadow when imports of soya beans will be resumed.

One effect that the public may quickly discern from the disappearance of soya flour is a deterioration in the palatability of ice cream. A large proportion of manufacturers have been using up to 4 per cent. of high-fat soya flour and correspondingly less wheat flour. They will now have difficulty in avoiding a rise in the wheat flour content if they wish to maintain the total solids contents of their mixes.

Industry and Research

If we are to restore our standard of living to pre-war levels, industry must make a productive effort substantially greater than in 1938, but with approximately the same man-power. This can only be achieved by ensuring a broad measure of co-operation between Government, employers, and operatives, and by the most efficient use of scientific research in its wider sense and throughout the widest fields. This was the theme of the President of the Federation of British Industries, Sir Clive Baillieu, in his address in opening a two-day conference on Industry and Research.

Sir Clive warned his hearers that although we have maintained a foremost position in the field of scientific discovery and research which provides us with the fundamental equipment necessary for the efficient conduct of industry, we can only maintain our position in the world if the result of such discovery and research is converted into effective production. The collaboration between industrialists and research workers must be closer, the aim being to increase the efficiency of our existing production and the output per unit of man-power. Upon this will depend our industrial recovery and also the creation of those new materials and the development of those new industries that are essential to enable us to retain our position as a great trading and commercial nation.

A new Industrial Revolution was necessary, in character if not in degree. The British manufacturer of the future must not be satisfied with supplying high quality examples of traditional articles of commerce but to create new ones—specific materials for specific objects with individual properties to meet definite needs.

The need for more Universities with Scientific Departments and many more Technical Colleges, so that science and technology may permeate every section of all industries and not merely filter from their research laboratories, was urged by Sir Robert Robinson in his opening address to the conference. How fundamental should research in industry be? asked Sir Robert. While circumstances might alter cases and attention be paid to the undoubted shortages of scientific man-power, there is an increasing tendency for the larger establishments to embark on basic scientific research which will usually be found to have an industrial objective, although possibly a distant one. Really blind research, industrially speaking, is better left to the Universities under present conditions.

Sir Robert Robinson cited research on penicillin as an illustration of war-time collaborative projects. The success of this and other war-time collaborations will be found to reinforce the argument that team-work could always be expected to facilitate the attack on a difficult problem, and that it is consistent with the freedom of individual scientists to follow their bent within the framework of the project. This did not mean that there are to be no captains or generals, or that there should be a hotch-potch of unrelated effort inside the team.

We are faced with new and harder conditions and must adopt a new technique of development if we are to survive the emergency. The revolution in methods must be of the order of that which has occurred in warfare. The first desideratum is an extension of scientific and technical education so as to render possible a massing of the battalions of research.

Rickets

It was rather disconcerting to read the latest and most reliable statistics in the Ministry of Health's survey on rickets published in March, 1944. The survey covered the whole country and was made for the Ministry of Health by the British Pediatric Association. By X-ray tests and other examinations it was found that about 4 per cent. of children under eighteen months had or had had rickets. By ordinary direct medical examination—that is, by examining the wrists, the bones of the chest, and of the legs—the figure was about 12 per cent., varying from 0 per cent. in such places as St. Albans to the staggering figure of 60 per cent. in Sheffield. Taking the more cautious X-ray figure, it must be concluded that about twenty-four thousand children in this country still suffer from rickets every year.

Dr. Stephen Taylor, speaking on the subject in the House of Commons, stated that the figures may have changed a little lately, because since January, 1944, the whole-cream dried milk issued by the Ministry of Food has had vitamin D added to it, sufficient to give 800 units per pint. But the problem remains a big one, because only children up to nine months of age are liable to get this dried milk and some children do not receive it at all. Dr. Taylor, mentioning the war-time social survey made for the Ministry of Food in April, 1944, emphasised the low percentage of mothers who collected the orange juice and cod-liver oil

available for their children. The failure of 30 per cent. to collect their vitamin supplements could only be remedied by more health education and improvement and imagination in the distributing machine.

In order to popularise cod-liver oil, Dr. Taylor suggested making a preparation of calciferol dissolved in arachis oil, which could be incorporated with ordinary chocolate.

In his reply, the Parliamentary Secretary to the Ministry of Health (Mr. Key) said that vitaminised chocolate was being produced, but vitamin A concentrate was scarce. It was the difficulty in getting the necessary qualities of vitamin A which prevented the use of that method.

Food Flavour

The secondary position occupied by flavour in foods until recently, according to the National Dairy Council of the U.S.A., is due to the fact that nutritional values have had first consideration. Few foods or groups of foods have received more consideration from the standpoint of flavour than dairy products. The flavour problem of the dairy industry is largely one of standardising production processes so as to retain the natural mild sweetness of milk and of controlling the characteristic flavours of its different products, thus obtaining uniformity in these flavours to suit consumer tastes in the various consumption areas. Each dairy product presents its own particular flavour problem. The production and handling of milk has been modified to protect its sweet rich flavour. Similarly, the elusive flavour of butter has stimulated studies to identify its source and investigation of methods to ensure a uniform product.

The development of eighteen distinct kinds and four hundred varieties of cheese illustrates the importance of eliminating the elements of chance in their manufacture. The National Dairy Council points out that regardless of the many other valid reasons why dairy products should be used in adequate quantities, sheer enjoyment of their flavour, as well as the flavour they impart to other foods, justifies their liberal use.

British Menus for Foreign Visitors

In the Press, if not in practice, the Come-to-Britain tourist movement as an " export " is opening up with various ideas for welcoming foreign visitors. With rationing in force, with many hotels requisitioned, and with transport far from being under full steam, the movement cannot be easily launched. But assuming—and it is a big assumption—that ministries and officials vacate the hotels in the near future, that Stratford and other of our *pièces de résistance* may afford comfortable lodging and adequate entertainment for our visitors, the vexed question of British cooking must not be ignored.

It is an old, oft-ventilated problem, though postponed in the rationing period when, in any case, foreign visitors were not here to criticise. It will be a vulnerable point when they do arrive, and one demanding unbiased and balanced judgment only to be given in fairness by anyone not in the catering trade himself and who has sampled British and European fare on and off the beaten track.

On the one hand, those of our countrymen, bigoted and often snobbish, who regard every foreign dish with foreign label as the acme of perfection and the only dish worth considering must be ignored. On the other hand, there are the complacent ones who accept British fare, provided there is enough of it and it is digestible, and who look upon meals as mere periods for satisfying hunger and punctuating the day. Their complacency is hinted at by the definition of cooking in our national encyclopaedia as " a decadent art ministering to the luxury of man, and to his progressive inclination to be pampered and to have his appetite tickled."

Though our country never had such disciples of good food as Brillat-Savarin, who held that " the discovery of a new dish does more for the happiness of man than the discovery of a new star," or as Vatel, that *maître d'hôtel* who committed suicide because the fish ordered from Boulogne arrived late, that is no reason for neglecting to bring our native dishes to as near a state of perfection as possible.

In judging the quality of our cookery (omitting the war period when factors other than rationing vitiated efforts towards improvement), a decline in the last two or three decades must be admitted if the historian does not exaggerate. As a " simple yet suitable " dinner the mid-Victorian Lord Dudley mentioned " a good soup, a small turbot, neck of venison, duckling and green peas or boiled chicken and asparagus, and apricot tart." Yet this, even prior to 1939, was more a banquet than a simple dinner. Going back still further, foreigners criticised our cuisines and grimaced at our menus. The Swiss C. P. Moritz, in his *Journey to England* of 1782, records an Englishman's mid-day meal as " a piece of half-boiled or half-roasted meat and a few cabbage leaves boiled in plain water on which they pour a sauce made of flour and butter, the usual method of dressing vegetables in England."

Much improvement must come, even to satisfy the less exacting visitor. One need only hark back to the 1939 days of plenty or sample the food available in many a provincial restaurant or hotel to appreciate this truth. Despite all our diplomas in cookery, despite our M.O.F. sermons and food flashes, and our many improved cookery books, the dismal picture is much in evidence outside those few restaurants which have seen the light. The time is short; and the job of reform is a long one.

The bunch of carrots on the left is first dehydrated (centre) and then compressed into four cubes (right).

Changes in Weight of Vegetables During Scalding

Part I

HAROLD GEOFFREY WAGER

During the scalding process, to which vegetables prior to being dried or canned are subjected, they either increase or decrease in weight and always lose soluble matter. In dehydration the change in weight is important since it affects the drying time and the throughput of the plant, and the loss of soluble solids reduces the yield and also affects the quality of the dried product. This article records experimental data obtained by the author.

MAGOON and Culpepper[1] investigated the changes in water and solid matter content of various vegetables in scalding. For spinach they state that "loss or gain (in weight during scalding) clearly depends on the freshness of the material." Later Horner[2, 3] and Adam, Horner, and Stanworth[4] have published figures showing that the loss of solids increases with the duration of scalding and find that "most vegetables lose weight in the first one to two minutes' blanching."

Processing Methods

Processing and the assessment of quality were carried out by methods already described (Allen *et al.*,[5] Wager *et al.*[6]), but a small steam scalder was also used in which the liquor that dripped from the scalding vegetables could be collected.

Loss or gain of water was determined by the difference between the weight of the unscalded material and its weight after scalding and draining. No allowance was made for surface water as there is no simple way of estimating it. Loss of solids was estimated by the change in yield of the dry product and by estimating the dry matter content of the scalding liquor or the liquor dripping from the tray of vegetable during steam scalding.

When no change in weight occurred during scalding the volume of drip liquor was below the theoretical requirement of condensate (about 15 per cent. of the raw weight of vegetables), presumably due to the loss by evaporation during the period allowed for draining. Nevertheless the changes in weight of the vegetable and of the volume of condensate correspond very closely.

Duration of Scalding

Aliquots of the same batch of strips of vegetables were scalded either in water or in steam for periods ranging from just sufficient to bring the strips to about 100° C. (*i.e.*, 0 min.) up to 10 mins. at 100° C. The change in wet and dry weight and the soluble material recovered in the scalding or drip liquor for different stocks of several vegetables are shown in Table 1.

In water scalding (Table 1, A. 554 and A. 776) the scalded weight was attained rapidly and equilibrium was reached by the time the material reached 100° C. The loss of soluble matter from

the scalding strips was, however, progressive, and if scalding was long continued became very large in amount, and depended on the ratio of the weight of the scalding liquor to that of the vegetable.

The loss in weight during steam scalding was rapid while the temperature was rising (*i.e.*, during the first minute) and thereafter became slower, but continued for a long time. Corresponding to these changes in weight, the loss of soluble solids was rapid at first and then continued more slowly.

Losses and Gains in Different Vegetables

The physiological state of vegetables, especially their water balance, depends partly on the environmental conditions of growth and partly on the length and conditions of storage. The relationship between the water balance and behaviour during scalding is such that each vegetable has to be considered separately.

Cabbage, although freshly gathered, gave shreds which normally increased by 10 to 20 per cent. in weight during washing. When scalded in steam there was usually an increase of 5 to 10 per cent. in weight, and when scalded in water increases and decreases in weight occurred which depended, in part, on the weight of material scalded (see below). The magnitude of the change in weight during scalding in water or steam also depended, in part, on the season and agricultural conditions of growth.

The seasonal variation may be exemplified by the behaviour of two groups of twenty stocks grown on loam; one group was harvested during a dry period in 1943 and a second during a wet spell in 1944. There was an average increase of 4 per cent. during water scalding in the material harvested in 1943 and a decrease of 4·5 per cent. in that harvested in 1944. The effect of agricultural conditions is shown by comparison of the behaviour of seven stocks grown on a moist fen soil in 1943 and harvested at the same time as the previous twenty stocks; these seven stocks lost an average of 6 per cent. in weight during scalding.

Small batches of material tended to increase in weight during single batch scalding and larger ones to decrease in weight. This is shown in Table 2, where the frequency of occurrence of a given percentage change in weight is related to the weight of cabbage scalded. In this table are collected all the observations made on cabbage over a period of two years.

Swede and Carrot. Root vegetables usually decrease in weight by from 5 to 15 per cent. during scalding, but exceptions occur. Out of a group of seventeen stocks of swede one did not change in weight during scalding, while the remaining sixteen lost about 11 per cent. (range 9 to 17 per cent.). There was a relationship between the water balance of the raw strips and the behaviour during scalding,

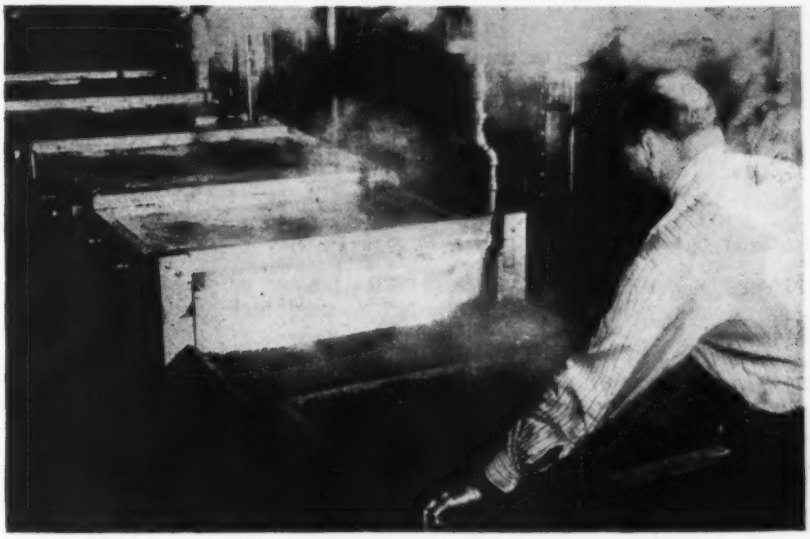
TABLE 1.

THE EFFECT OF DURATION OF SCALDING ON THE WET AND DRY WEIGHTS OF SCALDED VEGETABLES.

All weights are in grams and calculated on a basis of 1 kg. of raw strips.

Vegetable.	*Steam or Water Scald.*	*Duration of Scald.**	*Wgt. of Scalded Material.*	*Vol. of Drip Liquor.*	*Wgt. of Dry Matter in Scalded Material or in Raw.*	*Wgt. of Dry Matter in Drip Liquor.*
A. 534 Carrot ...	Steam	Not scalded	—	—	121	—
		0 min.	1,007	92	118	4·1
		1 ,,	990	139	114	6·0
		3 ,,	975	167	114	7·1
		7 ,,	967	139	114	6·8
537*a* Swede ...	Steam	Not scalded	—	—	129	—
		0 min.	1,007	104	123	5·5
		1 ,,	993	109	123	5·6
		3 ,,	982	114	124	6·0
		7 ,,	978	152	122	6·5
537*b* Swede ...	Steam	Not scalded	—	—	99	—
		0 min.	932	173	89	7·3
		1 ,,	902	193	90	8·4
		3 ,,	898	218	90	9·8
		7 ,,	878	241	88	10·3
602 Cabbage ...	Steam	0 ,,	1,095	—	—	—
		½ ,,	1,238	—	—	—
		1 ,,	1,227	—	—	—
		5 ,,	1,250	—	—	—
554 Carrot ...	Water	Not scalded	—	—	99	—
		0 min.	929	—	80	—
		1 ,,	914	—	73	—
		2 ,,	921	—	74	—
		4 ,,	902	—	72	—
		9 ,,	885	—	65	—
776 Swede ...	Water	0 ,,	935	—	79	12·9
		3 ,,	942	—	73	15·1
		10 ,,	936	—	68	19·4

* *This is the time at 100° C. and does not include a variable period of rising temperature.*



A tray of shredded cabbage goes into a steam blancher.

TABLE 2.

THE WEIGHT OF CABBAGE SCALDED AND THE CHANGE IN WEIGHT DURING SCALDING.

The figures in the body of the table are the number of examples in each class.

Wgt. of Cabbage Scalded.	*Wgt. of Scalded Cabbage as a Percentage of Wgt. of Raw Cabbage.*					
	70-79	80-89	90-99	100-109	110-119	120-130
0- 100 g.	—	—	—	21	4	—
101- 250 g.	—	—	3	12	4	2
251- 500 g.	—	6	10	34	8	—
501-1,000 g.	—	3	21	13	—	1
1,001-2,000 g.	—	2	10	4	—	—
+2,000 g.	1	8	6	—	—	—

since the raw strips of the exceptional stock increased by 48 per cent. on soaking in water, whereas the remainder increased by about 20 per cent. only. Much of this 20 per cent. was probably surface water, so that the water balance of the stocks was more different than appears from the figures.

The length of storage does not affect the weight less during scalding unless the roots have become wilted.

Potato. 30 to 40 c.c. of liquid may drain off 1 kg. of strips cut from "new" or freshly dug mature potatoes. Such strips usually lose weight (up to 2 to 3 per cent.) when washed in water and change little when scalded either in water or steam. On the other hand, tubers lifted in dry spells may have a large water deficit; some stocks have increased as much as 18 per cent in weight during washing.

The usual condition, however, is for the strips of potato to increase slightly in weight during washing and scalding (0 to 4 per cent.), but with long stored potatoes, especially if sprouting has started, the tubers become wilted and larger increases in weight take place. The effect of long storage in a somewhat dry store is shown by the following figures, which relate to twenty stocks of potato:

	$\frac{\text{Washed Wgt.}}{\text{Raw Wgt.}} \times 100$		$\frac{\text{Scalded Wgt.}}{\text{Raw Wgt.}} \times 100$	
	Mean.	*Range.*	*Mean.*	*Range.*
Processed Oct.-Jan.	100	96-104	101	94 108
Processed June-July after storage at +8° C.	109	104-119	115	107-122

Steam Scalding Wilted Vegetables

The water balance of strips of vegetables was altered either by drying them at a low temperature (90° F.) or by soaking in water, and thus strips were obtained which varied from being severely wilted to fully turgid.

The changes in wet and dry weights of vegetables during scalding and the volume and dry matter content of the drip liquors are shown in Table 3. Wilted strips always increase in weight during steam scalding, and in consequence the volume of drip liquor formed during scalding is much less than that from the unwilted controls. This increase in weight is limited in amount by the weight of condensate available.

The loss of soluble matter during scalding is less from wilted than from unwilted material, since both the volume of drip collected and its content of dry matter is less. In fact, with relatively severe wilting the loss of dry matter at this stage is negligible, whereas the controls lose about 5 to 8 per cent. of their dry matter. The soluble matter on the surface of the strips must therefore be absorbed along with the condensate.

These relationships are shown most clearly by

TABLE 3.

THE WET AND DRY WEIGHTS OF SCALDED WILTED VEGETABLES.

All weights are calculated on a basis of 1 kg. of raw prepared vegetables.

Vegetable.	Steam or Water Scalding.	Wet Weights.					Dry Weights.				
		Unwilted Control.		Wilted.			Unwilted Control.			Wilted.	
		Scalded Wgt.	Vol. of Drip.	Wilted Wgt.	Scalded Wgt.	Vol. of Drip.	In Raw Strips.	In Scalded Strips.	In Drip Liquor.	In Scalded Strips.	In Drip Liquor.
553 Carrot	Steam	966	142	834	890	40	117	110	7·4	117	1·2
		—	—	402	422	19	—	—	—	117	0·5
763 Carrot	Steam	952	270	731	800	85	118	114	8·7	120	1·1
		—	—	491	542	60	—	—	—	120	0·8
543 Swede	Steam	908	214	746	761	70	90	84	8·8	86	2·2
763 Carrot	Water	968	—	714	881	—	—	91	27·5	97	24·2
		—	—	402	660	—	—	—	—	98	24·4
770 Swede	Water	945	—	790	855	—	90	73	15·7	73	14·8

TABLE 4.

THE WET AND DRY WEIGHTS OF CABBAGE SCALDED IN STEAM AFTER SOAKING OR WILTING.

All weights are in grams and calculated on a basis of 1 kg. of raw unwashed strips.

Treatment.	Wet Weights.				Dry Weights.			
	Soaked Strips.	Wilted Strips.	Scalded Strips.	Vol. of Drip.	In Raw Strips.	In Scalded Strips.	In Soaking Liquor.	In Drip Liquor.
Dried raw	—	—	—	—	124	—	—	—
Scalded	—	—	1,042	110	—	124	—	2·8
Soaked and scalded ...	1,240	—	1,075	300	—	112	7·7	5·1
Soaked, wilted, and scalded	1,240	782	856	42	—	111*	7·7	0·5
Soaked and dried raw ...	1,240	—	—	—	116	—	7·7	—

* *This weight clearly is low, due to sampling errors.*

TABLE 5.

THE WET AND DRY WEIGHTS OF SCALDED SOAKED VEGETABLES.

All weights are in grams and calculated on the basis of 1 kg. of raw unsoaked strips.

Vegetable.	Steam or Water Scalding.	Wet Weights.					Dry Weights.					
		Unsoaked Control.		Soaked.			Unsoaked Control.			Soaked.		
		Scalded Wgt.	Vol. of Drip.	Soaked Wgt.	Scalded Wgt.	Vol. of Drip	In Raw Strips.	In Scalded Strips.	In Drip Liquor.	In Soaking Liquor.	In Scalded Strips.	In Drip Liquor.
543 Carrot	Steam	996	128	1,135	988	245	119	108	4·4	10·3	106	6·4
553 Carrot	Steam	966	142	1,116	968	290	117	110	7·4	10·0	101	—
540 Swede	Steam	985	114	1,287	1,035	386	134	129	4·1	16·3	107	10·1
543 Swede	Steam	908	214	1,090	907	292	90	84	8·8	7·1	78	7·6
543 Cabbage	Steam	1,181	40	1,347	1,213	320	123	123	—	4·1	114	5·4
763 Carrot	Water	968	—	1,149	984	—	118	91	27·5	10·8	87	24·4
770 Swede	Water	945	—	1,150	992	—	90	75	15·7	5·8	70	13·8

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Strips of carrot, swede, and cabbage when immersed in water usually increased in weight. The rate of uptake was rapid and about half occurred

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The Food and Agriculture Organisation at Quebec, under the inspired guidance of Sir John Orr, conjures up visions of a land flowing with milk and honey, where every man shall eat his fill, and live at peace with his neighbours. In that ideal world, when the question of filling hungry mouths with bread has been answered, and fish, flesh, and fowl are available for all, we may perhaps be able to leave the choice of an adequate diet to individual appetite and inclinations. Nice calculations as to the adequacy in calories, proteins, and vitamins may become unnecessary. But there is a long road to travel, and for the present the urgent need is to make the best use of what foodstuffs are available. The victorious nations must decide how far help can be given to the vanquished and how far charity begins at home. In each community the claims of the mother and young child must be balanced against those of the wage-earner, the adolescent, and the aged.

The Need for Knowledge

For the solution of these problems energetic action, good will, and high ideals are needed. These virtues in themselves, however, will not prevail without a sound application of the scientific principles which underlie the production and consumption of food. Much has already been done in this direction, at least in this country. Since the introduction of rationing, food policy has been planned with due regard to expert advice, largely through the personal efforts of Sir Jack Drummond. The value of scientific guidance, however, must depend ultimately upon the healthy development of the sciences concerned, and on the enthusiasm, efficiency, and weight of numbers of the workers who are attracted to them. Here we have less cause for satisfaction, and some anxiety may be felt as to whether we may still consider ourselves fairly placed in the international race for progress.

Since the first world war our knowledge of food and nutrition has expanded rapidly, until it now deserves to be treated as a major division of science in its own right, on equal terms with medicine and agriculture. Already such a high state of complexity has been reached that few persons, if any, can claim to be competent in all its branches. It is not surprising, therefore, that some critics should feel that arrangements in this country for the application of science to food problems are no longer adequate. Channels for the recruitment of the many additional workers who are needed are haphazard, and there are few facilities for training or for the award of qualifications. Research workers, except in certain laboratories which deal mainly with the more technical aspects of food production, are few in number, and have difficulty in keeping abreast with the rapid sweep of progress made by their multitudinous American colleagues. There is, throughout the whole science, a call for expansion, and with expansion for a better co-ordination of the various sub-divisions of knowledge which in widely different ways are concerned with food.

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The applications of science to food problems are numerous and diverse. A student to whom time was no object could with benefit acquire a full knowledge of agriculture, medicine, chemistry, sociology, and manufacturing processes before seeking to become an expert in food science. Since the shortness of human life makes such a course impracticable, however, it is important to decide what portions of the sciences mentioned are specially relevant to food science. How far, moreover, may the various interests be collected into groups so that the efforts of a particular research laboratory, or the syllabus of a course of training, may be designed to cover a recognised field? The following rough scheme may serve as a basis of discussion:

TABLE 3.

THE WET AND DRY WEIGHTS OF SCALDED WILTED VEGETABLES.

All weights are calculated on a basis of 1 kg. of raw prepared vegetables.

Vegetable.	Steam or Water Scalding.	Wet Weights.					Dry Weights.				
		Unwilted Control.		Wilted.			In Raw Strips.	Unwilted Control.		Wilted.	
		Scalded Wgt.	Vol. of Drip.	Wilted Wgt.	Scalded Wgt.	Vol. of Drip.		In Scalded Strips.	In Drip Liquor.	In Scalded Strips.	In Drip Liquor.
553 Carrot	Steam	966	142	834	890	40	117	110	7·4	117	1·2
		—	—	402	422	19	—	—	—	117	0·5
763 Carrot	Steam	952	270	731	800	85	118	114	8·7	120	1·1
		—	—	491	542	60	—	—	—	120	0·8
543 Swede	Steam	908	214	746	761	70	90	84	8·8	86	2·2
763 Carrot	Water	968	—	714	881	—	—	91	27·5	97	24·2
		—	—	402	660	—	—	—	—	98	24·4
770 Swede	Water	945	—	790	855	—	90	73	15·7	73	14·8

TABLE 4.

THE WET AND DRY WEIGHTS OF CABBAGE SCALDED IN STEAM AFTER SOAKING OR WILTING.

All weights are in grams and calculated on a basis of 1 kg. of raw unwashed strips.

Treatment.	Wet Weights.				Dry Weights.			
	Soaked Strips.	Wilted Strips.	Scalded Strips.	Vol. of Drip.	In Raw Strips.	In Scalded Strips.	In Soaking Liquor.	In Drip Liquor.
Dried raw	—	—	—	—	124	—	—	—
Scalded	—	—	1,042	110	—	124	—	2·8
Soaked and scalded ...	1,240	—	1,075	300	—	112	7·7	5·1
Soaked, wilted, and scalded	1,240	782	856	42	—	111*	7·7	0·5
Soaked and dried raw ...	1,240	—	—	—	116	—	7·7	—

* *This weight clearly is low, due to sampling errors.*

TABLE 5.

THE WET AND DRY WEIGHTS OF SCALDED SOAKED VEGETABLES.

All weights are in grams and calculated on the basis of 1 kg. of raw unsoaked strips.

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		Unsoaked Control.		Soaked.			In Raw Strips.	Unsoaked Control.		Soaked.		
		Scalded Wgt.	Vol. of Drip.	Soaked Wgt.	Scalded Wgt.	Vol. of Drip		In Scalded Strips.	In Drip Liquor.	In Soaking Liquor.	In Scalded Strips.	In Drip Liquor.
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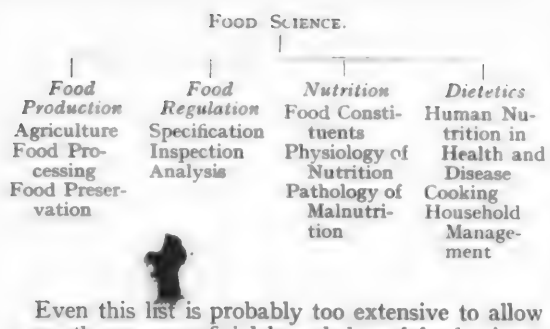


Even this list is probably too extensive to allow more than a superficial knowledge of food science as a whole to be acquired by one worker. Specialisation in one of the four sub-divisions must therefore be the general rule. It will also be necessary to decide what aspects of the subjects indicated must be covered. Thus, although the expert in food production must know about agriculture in so far as it concerns his own activities, it would be too much to expect him to have all the details of farm management at his finger-tips. Some overlapping of interests between the four sub-divisions is obviously unavoidable. The ultimate purpose of food science, except in so far as it concerns horses, dogs, and a few other animals not normally eaten by man, is to improve human nutrition. A knowledge of this subject is therefore fundamental to all workers interested in food.

Food Production

In regard to the science of agriculture this country seems reasonably well provided with facilities both for teaching and research. Degree or diploma courses may be taken in numerous universities and colleges. Research is undertaken both in the universities and in various institutes which concentrate on different aspects of agriculture. Thus, to mention but a few examples, soil science is investigated at the Rothamsted Experimental Station, Harpenden, or at the Macaulay Institute, Aberdeen; milk production at the National Institute for Dairying, Shinfield, or at the Hannah Research Institute, Ayr; poultry and pig production at the School of Agriculture, Cambridge, at the Harper Adams Institute, near Shrewsbury, and elsewhere.

Facilities for research on the processing and preservation of food are also fairly well developed, although the position in regard to teaching is less satisfactory. At Cambridge the Low Temperature Research Laboratory, under the auspices of the Department of Scientific and Industrial Research, is devoted to investigations on the various methods of preserving foods, with branches dealing with animal and vegetable products. The same Department conducts the Torry Research Station, near Aberdeen, which specialises in matters affecting the keeping properties and processing of fish. The problems concerned in the canning of vegetables are investigated in a laboratory at Chipping Campden, which is attached to Bristol University. The Cereals Research Station at St. Albans is mainly engaged on problems concerning wheat flour and the nutritive value of bread.

In addition, many commercial firms, either separately or in groups, conduct research laboratories which enquire mainly into their own immediate practical problems. The magnificently equipped Lyons laboratory, the Glaxo Research Laboratories, and the extensive laboratories of Chiver Bros. come to mind as examples of the excellent progress which has been made in many individual firms. The British Association of Research for the Cocoa, Chocolate, Sugar Confectionery, and Jam Trades may be taken as typical of the effort among manufacturers to pool resources for the common good. A medium for the public exchange of scientific views and information on food processing is found in the Food Group of the Society of Chemical Industry, which runs panels on nutrition and on microbiology.

Food Regulation

The regulations under the Food and Drugs Act which govern the sale of foods to the public are designed to ensure that they shall not contain toxic contaminants, and that the purchaser shall not be "prejudiced" by receiving some material other than that for which he has paid. Nutritive value, except for purposes of identification or specification, is not considered. If arachis oil, for example, has been passed off as olive oil, it is no defence to argue that the two oils are little different as sources of edible fat.

The organisation of food inspection, to which the Ministry of Health, Ministry of Food, local authorities, and Royal Sanitary Institute all make contribution, is beyond the scope of this article. It is sufficient to say that the final arbiter in the interpretation of the Food and Drugs Act is the Law Court. The scientific evidence on which prosecutions are based is collected, together with a much greater bulk of data on which no official action is taken, by Public Analysts. To obtain the necessary qualifications to act in this capacity candidates must pass the examinations of the Royal Institute of Chemistry, in which Branch E, on the Chemistry and Microscopy of Food and Drugs, may be taken. No official courses in these subjects are available, but students study privately for some years under the supervision of a Fellow of the Institute. Intercourse between Public Analysts is fostered by the Society of Public Analysts and other Analytical Chemists, which has *The Analyst* as its journal.

A fresh development in food regulation has resulted from the recent "Food Labelling Order" of the Ministry of Food, which has laid down that no unjustifiable claims may be made that foodstuffs contain vitamins. The analyst has therefore had

to add chemical tests for certain vitamins to his already extensive repertoire.

Nutrition

The science of nutrition, in its widest sense, concerns the feeding not only of man and animals but also of plants, moulds, and bacteria. In so far as the farmer is interested in feeding animals, which are in turn used for human food, nutrition overlaps on one side with agriculture. On the other side nutrition intermingles with dietetics, although the terms are not synonymous.

The facilities in this country for the teaching of nutrition as a distinct branch of science appear to be non-existent, but there are several research laboratories. The Rowett Institute, near Aberdeen, deals mainly with animal nutrition, but large-scale surveys of human diets have been undertaken. During the war only a skeleton staff has remained in the laboratory, but the adjoining Imperial Bureau of Nutrition has continued full-scale activities in the publication of "Nutrition Abstracts and Reviews." The Nutrition Division of the Lister Institute, Chelsea, has a long and distinguished record, particularly in vitamin research. The Dunn Nutritional Laboratory, Cambridge, where vitamins are also the main interest, is under the auspices of the Medical Research Council. This body is also responsible for another nutrition laboratory at Mill Hill, and for a Human Nutrition Unit, mainly concerned with colonial nutrition, which has its headquarters in London. The Nutrition Department of the National Institute for Research in Dairying naturally takes particular interest in the nutritive value of milk. The Oxford Nutrition Survey, as its name implies, is concerned with the assessment of the state of nutrition in different sections of the population. Vitamin estimations are undertaken for commercial firms in the laboratories of the Pharmaceutical Society.

The Nutrition Society

The exchange of ideas between those interested in nutrition takes place through the medium of the Nutrition Society. The policy of this body is to arrange periodical conferences on subjects chosen as having special interest and importance. The topics selected have ranged over all aspects of food science from the technicalities of food processing to the economic relations between income and food consumption. A census of dietary surveys in progress in this country, compiled by a Committee working under the auspices of the Society, has revealed a widespread interest in nutrition which is not confined to laboratories specially devoted to this subject. Unfortunately, on account of paper restriction, the Society has not yet been able to embark on a full-scale journal available for the general publication of papers of nutritional interest submitted without special invitation. Most original work on nutrition, therefore, must still appear for the first time in journals devoted to chemistry, biochemistry, or medicine.

Dietetics

In this country the term "dietitian" is often interpreted as meaning someone whose work is connected with hospitals. This tendency may be traced to the fact that the need for dietitians was first recognised in hospitals, where they were introduced to take charge of the preparation of food for those patients who required special dietary treatment. The development of dietetics was much more rapid in America than in England. When in 1925 Miss M. C. Broatch and a companion attended a conference of the American Dietetic Association, at which 2,000 members were present, they represented 50 per cent. attendance of the four dietitians who were practising in this country at the time.

Dietitians are now employed in hospitals to supervise the feeding not only of special patients but also of the patients in general and the nursing staff. The training and qualifications of dietitians are co-ordinated by the British Dietetic Association, an organisation formed in 1936, which has now about 300 full members working in this country. The Association inspects any training centre wishing to be officially recognised, and visits hospital departments and institutions where practical experience is offered. The essential academic qualifications for dietitians is a Diploma in Dietetics, which may be gained at King's College of Social Science, Kensington; the Glasgow and West of Scotland College of Domestic Science; the Royal Infirmary of Edinburgh, or the Royal College of Nursing. Both theoretical and practical training are included in the Diploma course, which lasts for about eighteen months. Elementary anatomy and biology, bacteriology, nutrition, cookery, budgeting, kitchen administration, infant feeding, and diet in disease are among the diverse subjects covered by the curriculum. Before taking the course students must have obtained a university science degree, or some suitable qualification, which must include physiology and chemistry among the subjects taken.

The present demand for qualified dietitians far exceeds the supply, and with further calls from the new public health services the requirements in the near future may be even greater.

Future Developments

Although all must admire the speed and energy with which the profession of dietetics has been organised, there are some who may share Mr. A. L. Bacharach's doubt that the present medical bias is entirely desirable. As this shrewd observer has pointed out, the population to be fed outside

hospitals greatly outnumbers that inside, and if dietitians are to be placed where they can have the greatest effect the school meals schemes must not be forgotten.

Most would admit, however, that the hospitals do require dietitians who have received highly specialised training. The stalwart efforts which are being made to satisfy this demand are most commendable, but the necessity for other dietetic and nutritional workers with distinctly different qualifications should not be overlooked.

For the Dietetic Diploma a distinct type is being developed. Upon the basis of a moderately advanced scientific training is superimposed thorough instruction in cooking, catering, and staff management. The student, in practice if not in theory, is almost invariably female. Other types, both less and more highly qualified from the purely scientific side, are obviously required. Below the hospital dietitian in scientific status there is a crying need for large numbers of well-trained cooks, with just a smattering of scientific training to enable them to understand the guiding principles in cooking food so as to preserve its flavour and nutritive value. This training should be sufficient for the organisers of meals in schools, restaurants, and canteens, and might be given on a part-time basis and rewarded with a certificate.

Above the hospital dietitian in scientific status there is a no less urgent need for relatively smaller numbers of workers, of either sex, who could combine training in human dietetics with an advanced knowledge of the science of nutrition, or of the technical intricacies of food production and preservation. Such workers should not be expected to overload their intellects with the mass of domestic detail which is so essential to enable the hospital dietitian to make a success of her job.

University Degrees in Food Science?

In the present state of evolution of the food sciences it appears that recognised qualifications may be obtained in the analysis of food and drugs and in dietetics. For the former individual training under expert supervision is necessary, but for the latter there are recognised university or college courses. In regard to food production and nutrition, research and routine workers with a variety of qualifications in science or medicine are enlisted, and usually acquire their specialised knowledge piecemeal in the course of their employment. Thus a graduate engaged to work on meat may have qualifications either in physical chemistry or in biology, and to a great extent his approach to the problems before him will be influenced throughout his life by his early training.

While some may consider that food problems are best attacked by teams of experts who can each contribute their own specialised knowledge, the desirability of some person capable of directing and co-ordinating their efforts is obvious. The pressing need, therefore, is for scientists whose training has been specially designed to make them reasonably competent in all branches of food science. It is here that the universities might help. A three-year course might include in its early stages elementary chemistry, physics, biology, and physiology, all treated with a view to their application to the study of food and nutrition. The second-year syllabus might cover the rudiments of the production, composition, and processing of food, and the fundamentals of nutrition as applied to man and animals. During the third year it should be possible to offer varied courses according to the direction in which the student intended to specialise. Those interested in food production might learn something of industrial methods and machinery, while those making nutrition their main objective could study the pathology of malnutrition and the biological significance of the various nutrients.

To which university will fall the honour of establishing the first "Department of Food Science"? London already has a chair in dietetics, as well as a reader in nutrition. Cambridge has laboratories devoted to food processing and to human and animal nutrition. Aberdeen has the largest nutrition laboratory in the country. Will it be one of these, or one of the many unnamed, which will first have the vision to give food a place on the curriculum in keeping with its importance for human health and happiness?

The Spirit of Research

Many of those trained in food science will take up employment in which their activities will be confined to the application of the wealth of knowledge which is already available. In doing so they will follow a tendency which was inevitable in this country during the war, when it was more important to benefit by what is already known than to collect new knowledge. Distinguished research workers left the laboratory for the ministerial office and juggled with calculating machines in their search for adequate food for millions of mouths.

The present depletion of the ranks of active research workers, however, should not give rise to the impression that the last chapter of food science has already been written, and that nothing of importance now remains to be discovered. Our knowledge, although swelled by twenty years of magnificent achievement, is still fragmentary and lacks co-ordination. There has been a tendency, perhaps, to focus attention on the chemical composition of diets, and to neglect the dynamics of digestion and assimilation, and in particular the effect of psychological factors. In these hard times, moreover, we have naturally been preoccupied with the ill effects of inadequate diets, and the very real dangers of constant over-indulgence in rich or otherwise unsuitable foods in times of peace and

plenty have naturally been overlooked. There is still as much need as ever for fostering the spirit of research.

The Almighty Dollar

In this direction food scientists here may envy the strong material backing which has been afforded to research on the other side of the Atlantic. Ample funds are available not only independently through the universities but also through an organisation known as "The Nutrition Foundation, Inc." This body was organised by food and related manufacturers for the purpose of developing a comprehensive research and educational programme in the science of nutrition. About fifty well-known firms make financial contributions, and from them representatives to an advisory committee are appointed. There is also a scientific advisory committee made up of fifteen eminent food scientists. Between May, 1942, and June, 1944, funds totalling $530,040 were distributed in support of eighty-seven projects in nutritional research, carried out in universities, colleges, and hospitals. The amounts awarded varied from $600 for "nutritional research equipment" to $27,600 for research on the "amino acid requirements of man." To sustain a journal for the publication of reviews on the literature of nutritional research $35,000 was granted.

It is true to say that the spirit of research is not to be bought with money. It might also be argued that the financial recognition of the nutritional research in America has been gained at the expense of advertising propaganda which has possibly carried personal preoccupation with food values beyond the bounds of reason. This consideration, however, does little to mitigate the feeling of inferiority in numbers, if not in ability, which British workers must often have. Let us hope that the day is not far distant when this country may make a contribution to research which is fully in line with the importance of nutrition to our population, at home and overseas, and which is worthy of the fine record of British pioneers in food science.

The Scientific Basis of Nutrition

In a second edition of his book* the author calls attention to the immense strides that have been made in educating the public about the importance of nutrition since it was first published in 1938. Through the public relations policy of the Ministry of Food tens of thousands of people now realise how profoundly food and drink may affect their physical and psychological well-being. Among them may be many "ordinary men" who would like to know something of the reasons behind all the good advice which has been given to them. It is mainly to these intelligent "laymen" that the author hopes to appeal.

As in the first edition the book is dedicated in Latin to the Norwegian albino rat, in view of the invaluable contribution which this little animal has made to nutritional research.

The main contents of the book are divided into five sections, dealing with the experimental basis, classical nutritional science, minerals, vitamins, and diet and human health. Each section contains from two to seven chapters, and for ease of reference the paragraphs in each section are numbered.

Since the author's aim has been to capture the interest of the ordinary reader, rather than to instruct the student or inform the specialist, he has treated his subject in an easy informal style. The atmosphere suggested is rather that of the study fireside than of the lecture room. In illustrating the underlying principles of nutrition, material has been chosen without undue regard to the order or balance of presentation, providing that the theme selected is both interesting in itself and relevant to the point under discussion. Thus the question of "identifying vitamins" has been illustrated by a full historical account of vitamin D, which is followed by only a few words on how the other vitamins were identified. The procedure may possibly leave the reader with no previous knowledge of nutrition with rather an unbalanced picture, but for those who already know something of the subject the effect is stimulating and makes delightful reading.

In discussing the social implications of nutritional discoveries Mr. Bacharach touches on the economic aspects of nutrition, and observes that by the use of synthetic vitamin D infantile rickets could be entirely eliminated from this country for a comparatively trifling cost. Few will disagree with this statement. Opinions may be more divided, however, on the further claim, made in the last paragraph of the book, that good cooking and eating are unimportant as compared with more money in promoting good nutrition. With prices in different countries jumping round between the low levels allowed by Government subsidies and the Alpine heights of the black market it seems that undue emphasis of the monetary aspect of nutrition may be misleading. The immediate call seems to be a greater production of food; the provision of money to buy it is a secondary consideration. Moreover, until we reach that millennium when we can afford to spoil good food by bad cooking, and still be well nourished, the importance of correct kitchen procedure must not be under-estimated.

The present edition is fully revised and in parts re-written. The reader who wishes to refer to any particular subject has the help of an excellent index.

* *Science and Nutrition.* By A. L. Bacharach, M.A.(Cantab.), F.R.I.C. Pp. 142. London. 5s. net.

Margarine Manufacture

It is three-quarters of a century since the French scientist Mège Mouriés invented margarine. The details of his process have been told many times and his idea of emulsifying fats by churning with milk has been retained in principle to the present day, as will be seen by this account of modern methods.

THE production of margarine in Britain lagged in the early years, being carried out by small traders who produced an article of inferior quality which compared unfavourably with butter. It was only when the manufacture passed into the hands of larger firms, able to finance the necessary scientific and technical research, that real progress ensued.

This progress followed two main lines of development (1) the quality of raw materials used and (2) improvements in technical processes.

Raw Materials

In addition to the original beef fat fraction used by Mège Mouriés, many other fats and oils have been brought into use. First, there were lard, *premier jus*, olive oil, arachis oil, and sesame oil. Later, oils from cottonseed, soya bean, and sunflower came into use, and later still palm oil. Any oil or fat which has no unfavourable physiological effect and which can be freed from taste or odour may be included in the fat blend.

The introduction of the hydrogenation process facilitated the use of a large number of cheaper oils of low melting point, including that from whales and other marine animals, such process removing many of the unfavourable characteristics of highly unsaturated oils.

In selecting his blend of fats and oils, the margarine manufacturer thus has a wide range to choose from, the main considerations being cost and the characteristics of the final product, among which are melting point, texture, flavour, and plasticity.

Development of Technical Processes

The first development in the processing of margarine was the substitution of a mechanical churning of fat with milk for Mège Mouriés' complicated

The different fat blends travel along the pipes of the compound room to their respective tanks.

Vitamin concentrate is added to the churn.

The effect of cultures is checked by taking samples of the fermented milk.

digestive process. The next step was made towards the improvement of texture. If, after the churning process, the emulsion of fat in milk is allowed to cool slowly, the fat forms crystals of a size which gives it a granular texture. This granularity was first obviated by a rapid cooling of the emulsion with ice. Following the improvement of refrigerating machinery a British patent was issued to Schou in 1907 for the chilling of the emulsion, first by ice water cooling and later by running it over brine-cooled revolving drums, thus allowing it to solidify out of contact with the chilling medium.

In order to obtain a flavour as nearly as possible approximating to butter, sour milk was first used instead of sweet milk and afterwards skim milk soured by the use of pure cultures of bacteria.

Finally, improvements in plant and equipment have influenced the milk treatment processes in margarine manufacture in a number of ways.

Present Day Manufacture

Modern margarine manufacture is based on current principles of science and hygiene and depends on the emulsification of fresh skimmed milk with skilfully refined oils and fats. The principal processes concerned are:

1. The selection and preparation of the fat blend.
2. The preparation of milk, which forms the basis for the flavour and aroma of margarine.
3. The emulsification of the fat blend and the milk by the churning process.
4. The cooling and crystallisation of the fluid emulsion.
5. The kneading of the solid mass to give the desired plasticity and body to the margarine.
6. The packing of the finished product.

Preparation of the Fat Blend

The crude oils arrive at the factory in insulated tank wagons. They are treated with alkali, and the soaps produced by its combination with the free fatty acids contained in the oils removed by decantation. The decanted oil is then thoroughly scrubbed with water to remove traces of soap and other water-soluble impurities, dried, bleached, and filtered. The volatile odorous substances are removed by passing live steam through the oil in a deodoriser while raising the temperature. This is carried out under reduced pressure and the odorous substances pass into the condenser.

Where an oil refinery is part of the margarine factory, the refined oils emerging from the refining operations are usually stored in the liquid state at temperatures only a few degrees above melting point, preferably below 50° to 60° F., so that the effects of oxidation are avoided.

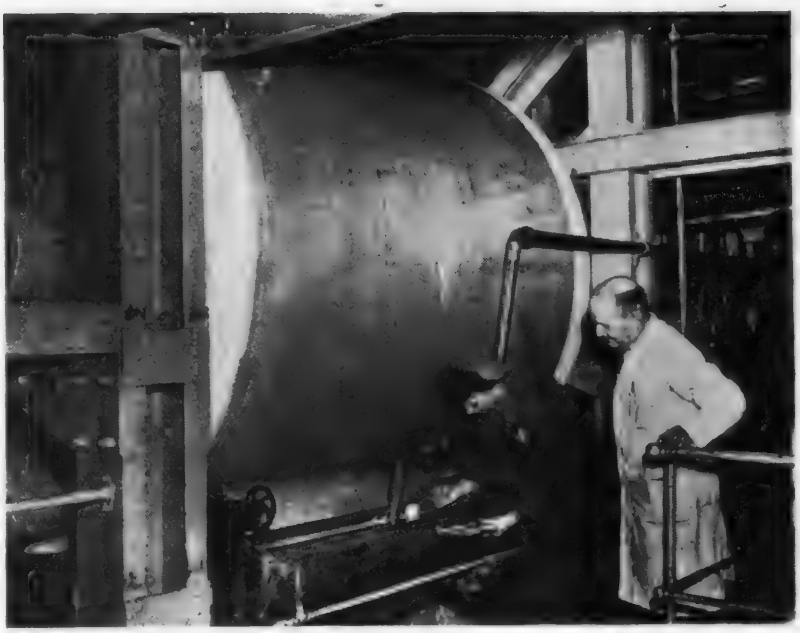
Preparation of Milk

The use of milk in the manufacture of margarine serves (1) to emulsify the fat and produce a physical consistency similar to butter (2) to introduce a butter flavour.

Pasteurised skim milk, or a solution of skim milk powder in water, is inoculated with a suitably blended culture of various lactic acid organisms; these organisms produce lactic acid and furnish a medium unfavourable to the growth of any undesirable foreign bacilli which may be present.

The usual ripening temperatures are from 20° to 25° C. and from 1 to 3 per cent. culture is added to the milk. After twelve to fifteen hours the acidity should have developed to the *p*H value of 4·3 to 4·5. The ripened milk is rapidly cooled to 10° C., or lower, and maintained at that temperature to curtail further bacterial growth. This product can be used as an intermediate culture to inoculate still larger quantities of

Crushed ice is added to the churn to assist the building up of the emulsion.



A sample of the margarine emulsion is drawn as it is fed to the cooling drum for checking moisture content.

pasteurised milk. The resulting ripened milk is then ready to emulsify the prepared fat.

Emulsification

The fat blend and the prepared milk are emulsified either by the "batch" or by the continuous process. The batch process consists of running the melted fat into churns containing ripened milk at 40° C.; the mixture is then agitated by means of paddles. Separate batches of 1 ton of emulsion are produced.

In the continuous type of emulsifying plant the fat and milk are churned for a short time at 25° to 35° C. in a jacketed cylinder fitted with a horizontal stirrer-shaft carrying blades working against perforated baffle plates fixed on the circumference of the cylinder, the perforations becoming more minute as the emulsion travels towards the exit. A continuous unit of this type produces several tons of margarine per hour.

The emulsion produced by the batch process is considered by many authorities to be more satisfactory. Churning is so arranged that a water-in-oil type of emulsion is obtained from the beginning.

For the production and maintenance of the required type of emulsion stabilisers are often added. For water-in-oil emulsions the stabilisers used include mono-diglycerides of fats and "emulsion oil," which is a polymerised oxidised semi-drying oil.

The margarine in flake form rests in trucks after leaving the cooling drums.

Cooling and Crystallising the Emulsion

It is necessary for the emulsion to be cooled and crystallised rapidly to "fix" it, and also to prevent the texture of the final product from becoming granular.

The method of cooling has at present several modifications, all of which are based on the fundamental principle of the solidification of the emulsion by passing it over the brine-cooled surfaces of revolving steel drums. For example, the emulsion

The loose crystalline mass is fed into the hopper of the multiplex machine, which consists of two rollers and an apparatus for cutting the margarine into slices; thence the margarine is conveyed on a moving belt to the kneading table.

may be fed into a trough into which dips a rotating cylinder, warmed internally by water at about 35° C. This is in contact with another cylinder of larger diameter which is cooled internally by refrigerated calcium chloride solution at about −10° to −15° C. and rotates in the same direction. The small drum picks up the emulsion and transfers it to the surface of the cooling drum, where it solidifies into a solid layer, which is scraped off in the form of flakes or sheets to be received in aluminium containers below. The solid emulsion is in an under-cooled state and is allowed to mature until the rise of temperature due to the release of heat of crystallisation has ceased.

Most cooling drums are now constructed for the use of direct ammonia expansion. Although the capital cost of the installation for the ice-water cooling method is much less than that for the dry cooling process, this is to some extent compensated for by the considerable saving on operating costs by the latter process.

Rolling and Kneading

The object of the rolling and kneading process is to consolidate and plasticise the loose crystalline mass formed as a result of the cooling process and to reduce the moisture content to a maximum limit of 16 per cent. The ratio of solid to liquid glycerides depends upon the temperature, which plays an important part in the efficacy of the kneading treatment.

After the margarine has passed through the rolling plant, usually a multiple mill, it is beaten on revolving kneading tables with paddles further to improve its texture.

The rolling and kneading consolidate and plasticise the product, which is finally improved in texture and appearance by agitation in a large blender.

Packing and Storage

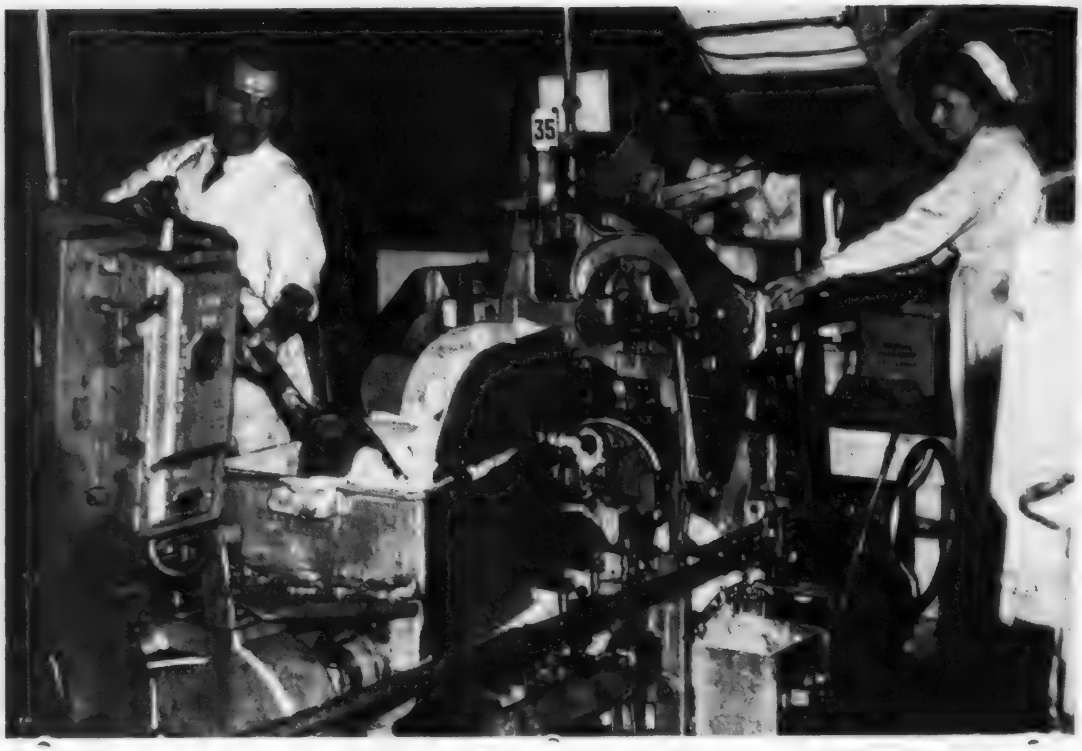
After cooling the finished product passes to the packing rooms. A larger part of the margarine is packed in this country in 1 lb. and ½ lb. blocks or rolls. Automatic measuring, packing, and wrapping machinery enclose the produce in vegetable parchment of the high quality indicated by the specifications of British Standards Institution.

Margarine is best stored at temperatures of 5° to 7° C., and if the raw materials are of the requisite quality and the processing operations cor-

View of margarine (entering the blender, which is fitted with S-shaped paddles.

Prior to automatic packing the margarine is allowed to regain its consistency.

The 'trucks (containing the margarine are run along rails into the packing room.



The finished product is accurately cut into appropriate units and wrapped by automatic machinery into ¼-lb. blocks or rolls.

rectly carried out, it will keep in good condition for from six to eight weeks, or even longer, depending to some extent upon the salt content, the presence or absence of preservatives, although it is best, conditions permitting, that margarine be consumed while from one to three weeks old.

Special Margarines

Apart from household margarine, which forms the greater part of that manufactured, margarines of different characteristics are made for manufacturing purposes, such as confectionery and cake-making.

In addition to salt, a number of other ingredients are added, according to the regulations in force in the country of consumption. Where permitted, boric acid, borax, benzoic acid, and sodium benzoate may be added. Egg yolk and lecithin are used partly as emulsifying agents and partly as aids to the formation of a fine powdery curd when the margarine is used for frying, similar to that formed by butter. The addition of these ingredients is effected either in the emulsion churns, during the kneading, or in the final blending.

Vitamin Reinforcement

The period of the war of 1914-1918 was of great importance in the history of British margarine manufacture. Most authorities on dietetics were satisfied that it was a good substitute for butter in so far as its heat-producing and digestive properties were concerned. Industrial research workers turned their attention to the problem of introducing vitamins A and D into margarine without spoiling its flavour or materially increasing the cost of production.

Source of Vitamins A and D

Vitamins A and D are obtained in concentrated form in certain fractions of whale liver oil and some fish liver oils. These fractions are separated from the oils by processes which avoid as far as possible the destruction of the vitamins and produce an exceedingly rich concentrate. Separation of the unsaponifiable fractions also avoids the introduction, with the vitamins, of highly unsaturated glycerides which are always present in the liver oils concerned, and which would increase the tendency of the margarine to turn rancid due to oxidation. The introduction of minute proportions of such concentrates in the margarine during the processes of emulsification confers the desired vitamin potency at a small cost and without affecting the edibility of the product. This advance dates from about 1928, and the production of "vitaminised margarines," with vitamins A and D contents equal to those of the best summer dairy butter, has since become an accepted feature of the trade.

A New Form of Dried Egg

O. DE ROUSSET-HALL AND J. R. HAWTHORNE

Low Temperature Research Station (University of Cambridge and Department of Scientific and Industrial Research)

This article describes the preparation, properties, and uses of a promising new type of dried egg—dried cooked egg—in the form of compounded tablets suitable for eating dry, or for reconstitution. It is made by drying minced, coagulated egg on trays in a current of warm air, and has a pleasant nutty flavour with none of the raw flavour of spray dried egg.

DRIED cooked egg[1] is produced by heating the egg melange in a steam-jacketed stainless steel pan until the egg, which is stirred continuously, forms a firm coagulum. It is then passed through a power mincer in which the diameter of the holes of the plate is conveniently $\frac{1}{8}$ in. The output from the mincing machine is fed directly on to wire-mesh trays and lightly spread to give an even loading of from 1 to $1\frac{1}{2}$ lb./sq. ft.; the minced coagulum is then dried in an over-draught oven with forced circulation. With a drying temperature of 60° to 75° C. a product containing 3 to 5 per cent. water is obtained after three to four hours. Some aggregation of the particles takes place, but this is not in itself disadvantageous. It is, however, essential that the melange should be coagulated adequately before mincing since, if the minced material is at all sloppy, the particles lose their discrete form and case-harden during drying. Some case-hardening also takes place if the diameter of the holes of the plate of the mincing machine is increased.

The addition of 1 to $1\frac{1}{4}$ per cent. of fat to the melange (5 per cent. on the dry weight basis) increases the rate of drying, the minced coagulated egg has less tendency to aggregate, and a more even tray loading can be secured; thus, in an experiment in a tunnel drier, the minced particles of both a fatted and an untreated coagulum were spread on the trays very carefully and dried under identical conditions. The sample with added fat dried to a water content of 5 per cent. in four hours as compared with five hours for the untreated sample.

In view of the shortage of shell eggs, it was necessary to use reconstituted spray-dried egg as the melange in most of the trials carried out in this laboratory. An experimental batch of about 2 cwt. of the product was later prepared at our suggestion from shell eggs in the laboratories of the Division of Applied Biology, National Research Council of Canada, and gave results agreeing closely with those obtained by using reconstituted dried egg. A smaller quantity was also prepared with the addition of sucrose to the fresh egg melange: it was found that the addition of 15 per cent. of sucrose accelerated the drying.

EXPERIMENTAL DATA.

Sample No.	*Oven Temp. (° C.)*	*Drying Time. (Hrs.)*	*Moisture Content. (Per Cent.)*	*Flavour Score.**		*Notes.*
				Control Stored at −4° F.	*Control Stored at 97° F.*	
6	71	$3\frac{1}{2}$	2·4	3·5	3·5	Egg pasteurised before coagulating.
2	71	8	3·2	—	3·3	
4	78	3	3·4	3·5	3·3	
3	88	3	3·6	3·4	3·2	
5	74	$3\frac{1}{2}$	3·6	3·4	2·9	
1	71	6	5·6	3·6	2·6	
12	70	$3\frac{1}{2}$	6·0	3·5	2·6	Prepared from shell egg.
7	71	$3\frac{1}{2}$	2·8	3·0	2·7	Dried cooked egg contained 14 per cent. whole milk solids, 1·5 per cent. salt, 84 per cent. egg solids.
8	71	$3\frac{1}{2}$	3·6	3·5	2·9	Dried cooked egg contained 27 per cent. milk solids, 18 per cent. sugar, 65 per cent. egg solids.
9	71	$3\frac{1}{2}$	5·6	3·3	2·4	15 per cent. sucrose added to egg melange before coagulation.
10	71	$3\frac{1}{2}$	4·4	3·2	2·7	10 per cent. sucrose added to egg melange before coagulation.
11	71	$3\frac{1}{2}$	2·4	3·5	2·6	5 per cent. sucrose added to egg melange before coagulation.

Tray loading 1 lb. per sq. ft. except for samples 1 and 2, which were loaded to 2 lb. per sq. ft.

* Scoring convention: 4, very good; 3, good; 2, fair; 1, poor; 0, very poor.

Uses

So far the product has been used for both sweet and savoury compounded egg blocks and in biscuits. Of the former type, a sweet egg block containing dried cooked egg, sugar, full cream milk powder, and fat has been prepared by compression and by moulding techniques. The blocks are very palatable when eaten dry, and the nutty granules of the egg confer a texture which is in pleasant contrast to that of most dehydrated foods when eaten in the dry form. The same mixture can be packeted loose as a most nutritious breakfast food, in which the insolubility of the egg particles is an advantage since they retain their nutty texture even when treated with hot water or milk; for this product the uncrushed granules are preferable.

One of the best savoury products is a mixture of dried cooked egg and smoked meat, but as the latter ingredient has been produced only on an experimental scale development has been impossible. The biscuits have been prepared to a number of formulae, a shortbread variety being most successful.

The possibility of eating the granules as such has also been considered, particularly by the workers in Canada, who have incorporated into the melange various other flavourings such as sugar and cocoa. At the Low Temperature Research Station a dried cooked egg flavoured with cheese has been produced. This latter product has good drying properties, but, for consumption in the manner indicated, it would probably be preferable to dry it in strips rather than in minced form.

Keeping Properties

The keeping properties of dried cooked egg have been investigated. A number of samples were stored in sealed cans with limited air supply for eleven weeks at 97° F.; they were then made into sweet egg blocks as above, and submitted to a panel of tasters for assessment of the acceptability of the product. In most cases a second block prepared from a sample of the same egg, but which had been kept in cold store at −4° F. for eleven weeks, was tasted at the same time.

The storage results (see Table) may be summarised as under:

1. The stored samples fall into two groups: those in which no deterioration had taken place and those in which significant deterioration had taken place.

2. The four samples in the first group had water contents of 3·6 or lower and were all prepared from egg to which nothing had been added before drying.

3. The three samples of untreated egg that deteriorated had water contents of 3·6, 5·6, and 6·0 respectively (the latter being prepared from shell egg). The first showed the least deterioration, and another sample with this water content which had been dried at a higher temperature also showed no deterioration.

4. Samples prepared from melange to which sugar, milk, or a mixture of milk and sugar had been added all deteriorated (especially a sample with the highest water content) even though some had water contents as low as 2·4 per cent. The result is interesting, as the addition of sugar to egg melange before spray drying retards the deterioration of the product during storage at 97° F.[2]

5. The storage life of dried cooked egg is distinctly superior to that of spray-dried raw egg at tropical temperatures, and it is considered that dried cooked egg could be used in the tropics if suitably packed.

REFERENCES

[1] J. R. Hawthorne, *Brit. Pat.* 546,772.
[2] J. Brooks and J. R. Hawthorne, 1943, *J.S.C.I.*, **62**, 165.

The work described above was carried out as part of the programme of the Food Investigation Board in collaboration with the National Research Council of Canada. It is published by permission of the Department of Scientific and Industrial Research.

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A Victorian Pioneer

In an age in which emphasis is more on rights than on duty and when every effort is being bent towards provision for everybody by everybody else from the pre-cradle period to the grave, it is refreshing to read the life story of an individualist who, by thrift, hard work, humility, straight dealing, and a deep religious faith, rose from poor estate to become a multi-millionaire and lived to see the bulk of his fortune benefit mankind. Such is the story* of Joseph Rank, "the mighty miller of Hull."

His life (1854-1943) epitomises the period of this country's history through which he lived, and the book has many interesting anecdotes of his business methods and his activities outside business hours. The development of the technical side of the milling industry is but lightly touched upon, and few statistics detract attention from the pen-portrait of this great Victorian.

The roots of the Rank family go deeply into the history of East Yorkshire. When Joseph Rank was born the occupation of milling meant a primitive country life. The methods of milling had not changed for centuries; competition was keen; few millers made a decent living. Joseph was regarded by practically the whole family as a slow, dull boy, and, on his father's death, he was not considered qualified to run his father's business. Undaunted, he set up as a miller in 1875 with the £500 left him by his father.

Starting his career by sweeping floors, mending bags, grinding, packing, and dressing old millstones, much of his power in climbing the ladder of success was due to the intimate knowledge thus gained. When trouble was experienced in the mills, he not only knew what required doing, but, if necessary,

* *Through the Mill.* By R. G. Burnett. Pp. 226. London. 10s. 6d.

could do it himself. He realised that if he was to work his mill to the utmost the uncertain motive power supplied by the winds must be supplemented from some other source. Amid the derision and incredulity of other millers he installed an engine for this purpose.

By 1880 he had turned the corner financially, and thereupon married. To his quiet, gentle, self-sacrificing wife much of his success was due. She helped him with his books and made his home a haven from the troubles of the constant struggle against keen competition.

Another important factor in his success was his flair for selecting his subordinates, and it is interesting to read that he was an enthusiastic and practising phrenologist. It is recorded that a large nose, or ears set well down in the head of the applicant for a position, would especially impress him, and that he had even been known to get the candidate out of the room on some pretext while he solemnly tried on his hat.

He early realised that something revolutionary in the milling trade had to be done if the serious American competition which had developed was to be combated successfully. The book traces the development of this revolution, with many interesting sidelights on the character of the man bringing it about.

Although within the industry the new methods were at first scoffed at, if not resented or condemned, it soon became apparent that they were going to succeed. The Alexandra Mill was not the first roller mill, but it embraced all the most up-to-date improvements in the milling technique of that time, and, like all his later projects, ample provision was made for future expansion.

Rank engaged W. H. Raylor as a full-time traveller, a rare thing for millers to have in those days. His new roller process in time reduced the price of bread and improved its quality. Furthermore, it could handle foreign wheats that could not be handled by stones. The process also allowed two or more qualities, or grades, of flour to be made from the same wheat, an accomplishment beyond the power of stone grinding. To deal with the hard varieties of wheat a process—conditioning—was invented which developed into an important part of milling technique.

The whole story is one of close attention to the smallest detail, inflexibility of resolve to make the best product, and, in an age which did not regard the profit motive as something anti-social, to sell at a profit. A " tough " business man, respected as much for his character and straight dealing as for his shrewdness, he demanded from his employees their utmost, he himself setting the standard by example. In return he recognised their moral and material claims upon him. He endeavoured to follow the precept of John Wesley, "Gain all you can, save all you can, give all you can," and certainly in the last he was pre-eminent, donating several million pounds to numerous good causes and to the Methodist Church. Such gifts were not just dispensed through his secretary, but were personally donated after close consideration of the details of each case, whether the gift was large or small.

The book will not only be of interest to all connected with the milling industry, but to very many others in industry as a whole. It provides several hours of stimulating and enjoyable reading and would appear to carry a moral applicable to the present times.—J. A. RADLEY.

Freezing of Apple Juice

AN investigation of the quality and purity of frozen apple juice after certain periods of freezing and thawing was recently published by Joseph Forgacs, W. A. Ruth, and F. W. Tanner of the University of Illinois (*Food Research*, March-April, 1945). It had been reported that in order to extend the marketing season, recently pressed apple juice is sometimes frozen in gallon jugs or large containers and later thawed and sold on the market as fresh juice. A second and third freezing may be possible, and the problem of survival of numbers and types of organisms at various stages should be considered.

It has long been known that by virtue of their organic acid content fruits and fruit juices have bactericidal properties against certain micro-organisms. While various investigators have shown that freezing and holding of the juices reduce the content of micro-organisms, enough of them remain to cause spoilage after thawing if the juice is held at room temperature.

The investigation involved twenty-four samples of juices from six different varieties of apples. After pressing, the juice was strained and clarified and run into clean gallon jugs. A portion was frozen and held at 10° F., while another portion was held at −10° F. for 7 months and a third at 0° for 12 months.

The first portion was removed from cold storage every 7 days and allowed to thaw at 77° F. for 24 hours and refrozen. The second portion was removed every 14 days, allowed to thaw for 12 hours and refrozen. The last portion, which had been constantly frozen, was allowed to thaw 17 hours at room temperature at the end of the experiment.

It was determined that most juices which were thawed and refrozen were unsuitable for human consumption when the investigation was concluded. The detailed data presented in the paper illustrates the importance of rapid handling of frozen juices in order to prevent spoilage by micro-organisms. According to this data, the organisms remaining at the end of the freezing period probably will bring about putrefaction and acid formation rather than formation of alcohol and carbon dioxide which make hard cider.

Food Production in Ulster

OFFICIAL figures have just been issued showing the quantities of food sent by Ulster to Great Britain during 1945.

The record number of 156,690 fat cattle, 17,158 fat sheep, and 270,000,000 eggs were shipped to Britain, while shipments of fresh milk rose from 20,000 gallons per day to 34,000 gallons during the year.

Ware potato supplies amounted to 105,268 tons, of which 74,000 tons were devoted to civilian needs and the remainder to the American and other Occupation Forces in Europe. During the same period 74,280 tons of seed potatoes were supplied, and, notwithstanding the drop in the pig population due to restriction of feedingstuffs, bacon and hams valued at £140,352 were sent.

The Government of Northern Ireland states that every effort will be made at least to maintain these supplies during 1946.

Some Aspects of Hydrogenation

S. GLICHER

The hardening of liquid oils or fats of soft consistency by the catalytic addition of hydrogen, to yield hydrogenated products of greatly increased consistency, is due to the conversion of olein, linolein, and other unsaturated glycerides to synthetic stearins, the higher melting point of the latter causing this change in physical properties. This paper describes the " dry reduction " and " wet reduction " processes, and sketches some of the theories of hydrogenation with their implications.

At the end of the nineteenth century Sabatier and his co-workers were able to show that the addition of hydrogen to unsaturated compounds in the presence of finely divided nickel was a general reaction. The reactions were carried out in the vapour state, but nevertheless these experiments are the foundation of the modern processes of hydrogenation. Since that time a large number of patents have been taken out dependent upon methods involving intimate mixing of oil, catalyst, and hydrogen, and other processes such as that of Ittner[1] who used a round-bottomed vessel in which the oil was placed and stirred by a special stirrer which also acted as a hydrogen distributor.

In the presence of catalysts oleic acid and hydrogen combine in equimolecular proportions to yield stearic acid:

$$C_{17}H_{33}COOH + H_2 = C_{17}H_{35}COOH$$

Consequently, 282 lb. of oleic acid require 2 lb. of hydrogen for the production of 284 lb. of stearic acid, and similarly the transformation of olein into stearin requires the use of approximately 0·68 per cent. of hydrogen. Thus, by weight, only a relatively small quantity of hydrogen is needed.

Several methods of hydrogenation have found favour in practice, but, like most newer processes of notable commercial value, proposals have been made for carrying out the operation in a variety of ways. All the procedures commercially applicable have the same object—to secure an intimate contact of the hydrogen gas with the oil and catalyst. This is accomplished in various ways. One method is to spray the oil mixed with catalyst into a chamber containing hydrogen and to continue the spraying operation until the required degree of hardness is achieved. Another method provides for violent agitation of the oil and catalyst in a closed receptacle in the presence of hydrogen. By another system the hydrogen gas is bubbled through a body of oil and catalyst, any unabsorbed gas being collected and re-used.

The latest development, as proposed by Bolton and Lush, consists of the catalyst being in the form of a cage packed with nickel wool. A number of these units are fitted into a long iron container which is heated to 180° C. The oil flows down over the catalyst, while an atmosphere of hydrogen is maintained at a pressure of 30-40 lb. The system has the advantage of being continuous and is probably the most suitable where small drops of iodine value are required. The catalyst is activated by anodic oxidation in 2 per cent. sodium carbonate solution; then, after reduction in the tube and drawing off any water, the apparatus is ready for use.

Metals such as palladium and platinum are most effective. They are suitable for laboratory reductions because they are active at lower temperatures. Skita described a method[2] in which the substance is mixed with an aqueous solution of palladium chloride containing gum arabic and acidified with hydrochloric acid; on occasion alcohol and ether are added. On passing hydrogen into the mixture colloidal palladium is produced, the gum arabic acting as a protective colloid, and the hydrogenation is carried out.[3]

The essential constituent of all catalysts used in the hydrogenation of oils at the present time is nickel. There are two distinct methods of manufacturing the catalysts employed, one being known as the dry process, involving the reduction of nickel compounds in the dry state, and the other as the wet process, or wet reduction, involving preparation by reduction in oil or other vehicle.

Dry Reduction

For the dry reduction process it is customary to precipitate an insoluble nickel compound on an inert finely divided carrier such as fuller's earth or kieselguhr. The inert material is added to a solution of a nickel salt, usually nickel sulphate, and soda ash is added to precipitate nickel carbonate upon the carrier. The material is thoroughly washed by decantation or in a filter press, and then dried and reduced in a current of hydrogen gas. A temperature of 300° C. gives fairly complete re-

duction with the hydrogen gas, and is a satisfactory working temperature. The lower the temperature at which the nickel is reduced the more sensitive it is to various external influences. The preparation of this catalyst should be conducted, therefore, not only with respect to degree of activity, but also with respect to longevity.

Wet Reduction

This method of reduction has proved more simple and reliable than the dry method. The wet reduction process is merely carried out by adding finely ground nickel salt to the oil, heating, and introducing hydrogen gas until reduction is complete. One of the most popular compounds employed in wet reduction is nickel formate. When heated in a vegetable oil to a temperature of about 240° C., nickel formate breaks down, yielding finely divided semi-colloidal nickel. A temperature of 240° C. will slightly affect the quality of a vegetable oil, such as cottonseed oil, used as the suspensory vehicle in carrying out the reduction, and if the catalyser is to be employed in making edible fat it is advisable to filter out the catalyst and wash it with fresh oil to remove the oil employed originally. The latter may be returned to the refinery or used for non-edible purposes. The mixture of oil and catalyst is heated in a tank to a temperature of 180° to 180° C., or a current hydrogen gas is passed through the oil mixture, and is continued until the oil has been increased in consistency to the desired point.

Well-refined vegetable oils do not impair the quality of the catalyst as rapidly as oils which have not been fully refined, and contain impurities such as soap. Fish and whale oils, on the other hand, soon impair the catalyst. The catalyst may therefore be used repeatedly in hydrogenating vegetable oils. When employing 0·2 per cent. to 0·5 per cent. of nickel, based on the weight of the oil in ordinary circumstances, the catalyst may be used to harden from five to ten batches of oil. No ruling can be laid down, however, as variations in the kind and quality of the oils which are being treated, purity of hydrogen, and other conditions affect the life of the catalyst.

In order to recover the nickel from a spent catalyst the oil is first extracted by means of a solvent or by heating the spent catalyst in alkaline brine. The residue is treated with hot dilute sulphuric acid, and the nickel is recovered as the sulphate. It may prove necessary to remove iron from the latter. From the sulphate the carbonate and formate may be prepared.

Theory of Hydrogenation

Two main theories have been put forward, one chemical and the other physical. The chemical theory postulates that compounds are formed with the catalyst, which rapidly disintegrate into smaller combinations, and the consequent regeneration of the catalyst. The intermediate combinations were stated to be loose compounds of indefinite composition.

The physical theories were put forward by numerous workers. Lewis[4] based his radiation theory on the hypothesis of Arrhenius for the existence of active and inactive molecules. The combined work of Hilditch, Taylor, Rideal and Armstrong and Langmuir eventually resulted in a more clarified physical theory. The present idea of the mechanism of catalyst action involves all the other theories. The first step is adsorption of the reactants on the surface; these molecules are held by valency forces, and then under favourable conditions are activated. Taylor showed that promoter action is of two types: (*a*) new centres are produced; (*b*) the existing active centres are maintained intact by the addition of the promoter.[4]

Selective Hydrogenation

If a mixture of linolein and olein is hydrogenated it is found that the linolein is preferably hydrogenated into olein prior to any of the latter being converted to stearin. This principle is generally applicable to the hydrogenation of unsaturated fats. It has been stated that when any oil is hydrogenated, the glycerides less saturated than olein are transformed to olein before any material increase in the glycerides of saturated fatty acids occurs.

This remarkable fact has several practical implications. For example, the composition of a hardened fat of a given iodine value cannot be reproduced by mixing a much less hardened with a more hardened fat. On the other hand, it is fortunate that the process is so selective because for many purposes the presence of glycerides more unsaturated than olein is undesirable, since they are more liable to atmospheric oxidation, with the consequent development of rancidity. The monoethylenic glycerides are not all liquid, however. When, therefore, linolein is partially hydrogenated the resultant product is a mixture of several oleins, some of which are solid, and for various purposes are by no means as adaptable as liquid olein at normal temperatures.

Fatty Alcohols by Hydrogenation

A different kind of hydrogenation can be performed—namely, the reduction of the carboxylic or ester group to the corresponding alcohol by the action of hydrogen in the presence of an appropriate catalyst at 200-250° C. under 100-200 atmospheres pressure. Before the discovery of this process the only method for the manufacture of higher fatty alcohols was that demonstrated by Bouveault and Blane, who reduced the corresponding esters by means of sodium and alcohol.

There is an increasing demand for higher fatty

alcohols, because of the growing use of sulphated and sulphonated fatty alcohols and amides, the sodium salts of which are suitable as detergent and wetting agents. Consequently, their technical production has become important.

A process developed by the Deutsche Hydreirwerke A.G. reduces fats and fatty acids to the corresponding alcohol at higher temperature and pressure, using a reduced basic copper chromate as catalyst. Adkins has pointed out that it is essential to use a copper catalyst because its substitution by nickel leads to excessive reduction of the alcohols formed to long-chain hydrocarbons and methane.

Hilditch has shown that by the technical process coconut and palm-kernel oil yield a mixture of alcohols containing about 50 per cent. of dodecyl and lauryl alcohols; tallows, lards, and palm oils similarly give a mixture of cetyl and octadecyl or oleyl alcohols; whale oil or fish oil a mixture containing tetradecyl, cetyl, and actodecyl alcohols, etc. The individual alcohols may be separated by fractional distillation under reduced pressure.

Uses of Hydrogenated Oils

The ability to prepare from ordinary liquid fatty oils a fatty body of almost any required degree of consistency renders hydrogenation especially attractive in the production of margarine, lard substitutes, shortenings, frying, and other cooking fats. Hydrogenated whale oil of excellent quality is now being manufactured and large quantities are used.

The term shortening fat originated in America, and denotes a fatty product used in biscuits and pastry for the purpose of producing a crisp or flaky effect in the baked article. Hydrogenated cottonseed oil of melting point 58° to 62°C. may be ground to a powder applicable as a dry shortening. The powdered fat may be mixed with flour and this used as stock for the batches of dough.

Mixtures of oils are often used after hydrogenation to suit certain purposes. Ellis has shown that hydrogenated "corn oil" improved the texture of hardened cottonseed oil. Partially hydrogenated cottonseed oil is found to be a superior fat for frying purposes. Hydrogenated oils are sometimes incorporated in the cheaper grades of chocolate as a substitute for cocoa-butter, although up to the present no really satisfactory substitute has been found, most of the alternatives failing in one or more respects. Hydrogenated fats have also been employed in the manufacture of cakes and biscuits. "Puff" biscuits usually contain certain properties of hydrogenated whale oil (Dean).

By hydrogenation, oils which formerly made soaps only of soft consistency now yield the more valuable hard soaps. Fish and whale oils have become very popular in this respect because they may be completely deodorised by the addition of hydrogen. Tsujimoto has stated that the odour of fish oil is almost entirely due to a fatty constituent and not to any so-called impurities. This fatty constituent is clupanodonic acid, $C_{17}H_{27}COOH$, which therefore, by the addition of eight hydrogen atoms, becomes stearic acid. When hydrogenated to an iodine value of about 50, fish oil has the consistency of hard tallow and the fishy odour is entirely removed. This product is satisfactory for soap-making purposes because the odour of the original oil is not apparent. The presence of excess fatty acids, such as stearic, minimises the solubility and lathering power of hydrogenated fats when employed as soap-making materials. Mixtures with softer fats, however, are found to be of value.

Hydrogenated fats are also used in pharmaceutical preparations and in leather stuffing operations as lubricants. Hardened castor oil may also be used in place of wax for the preparation of shoe polishes. It produces a hard, shiny, non-sticky film.

Of the fatty alcohols, apart from their extensive use in the manufacture of emulsifying agents, wetting agents, detergents, etc., cetyl alcohol is used in the preparation of cosmetic creams. A modern cold cream of the water-in-oil type may contain cetyl alcohol,[6] and the use of surface-acting agents such as the sodium salt of cetyl hydrogen sulphate in cleansing creams is quite common.

REFERENCES

[1] U.S. pat. 1,242,445.
[2] U.S. pat. 1,987,600.
[3] Dean: "Utilisation of Fats," London, 1938.
[4] *J.C.S.*, 1916, **109**, p. 796.
[5] Dean, p. 31.
[6] Augustin: *Reichstoff Ind. Kosmetik*, 1936, 11, p. 75.

From Music to Manners

MOST people in the canning and allied industry have known Mr. A. Ll. Matthison as the head of a progressive lacquer manufacturing firm, and it is probable that a good many are beginning to know him as a writer of autobiographies, sketches and essays, and even a play. In his latest volume* Mr. Matthison again exhibits his catholicity; he deals, among other matters, with literature, English law, food, smoking, pottery, music, trade, manners and customs, and pictures. The essays are light-hearted and full of amusing reminiscences of an active life. Four articles on Italy, by Kaila Matthison, his daughter, are included.

Copiously illustrated with black and white drawings by Mr. F. R. Smith, the volume can be recommended as an excellent bedside book.

* *In Reply to Yours.* By A. Ll. Matthison. Pp. 173. Birmingham. 12s. 6d. net.

Calcium and Blood Pressure

A SLENDER volume* has been published containing accounts of original scientific experiments carried out by Dr. I. Harris, who is Hon. Director of the Institute for Prevention of Disease, and Hon. Physician of the Liverpool Heart Hospital. In various parts of his investigations he has been assisted by J. T. Ireland, G. V. James, E. C. Lowe, and C. E. Vernon.

Hypertony, or, in more familiar terms, "high blood pressure," is associated with hardening of the arteries. In advanced stages of the condition the inner layer of the vessels degenerates, and in places crusty patches are formed, which are made up mainly of protein, calcium, and a waxy substance known as cholesterol. Dr. Harris maintains that the two root causes of high blood pressure are emotional strain and incorrect diet. He contends that the dietary factors which predispose to high blood pressure can be identified with the substances which are deposited in the arteriosclerotic patches.

While in this book both protein and cholesterol are fully discussed in their relation to hypertony, the significance of calcium is taken as a central theme. Experiments with rabbits are described in which the prolonged administration of calcium, with or without vitamin D, was associated with a considerable rise in the arterial blood pressure.

On the basis of this observation Dr. Harris strongly criticises the action of the Ministry of Food in adding calcium carbonate to the National flour, which he considers may endanger the health of the population. He recalls that this step was taken because unbaked wholemeal flour contains a substance called phytic acid, which, according to the Medical Research Council, interferes with bone formation by preventing the absorption of calcium from the intestines. Dr. Harris, however, considers that the phytic acid story is inconclusive. In his opinion the evidence in favour of adding calcium to the flour is quite inadequate to justify so far-reaching a step. In an outspoken criticism of the Medical Research Council's action he suggests that the policy of "adulterating" flour has been carried through only "to demonstrate the infallibility of a certain highly placed gentleman." The protagonists of the addition of calcium to flour are even accused of influencing the medical press against the publication of certain articles submitted by Dr. Harris.

All will agree that it is eminently desirable that action influencing the health of the nation should be based on exhaustive scientific enquiry, in which rival schools of thought have been allowed time to "fight it out." Many will consider that nutritional research is not yet conducted on a scale appropriate to the importance of the subject. But we must not forget that the Medical Research Council, unlike the author of this little book, is called upon to give advice for immediate action, and cannot always delay its decisions until the minority of scientific opinion has been finally convinced. Dr. Harris admits that his rabbits were given amounts of calcium much greater, in proportion to their body weight, than those received by humans in the National flour. His case that fortification is a real danger to health, therefore, appears open to the same charge of inadequate evidence which he levels against those in authority.

The book is clearly written, and contains a wealth of scientific data in tabular form. It deserves the attention of those who are interested in nutrition, or in the causes of premature old age, and who believe in the principle that in any controversy both sides should be given a fair hearing.

* *Studies on Hypertony and the Prevention of Disease.* By I. Harris, M.D. Pp. 114. Bristol. 12s. 6d. net.

Changes in Weight of Vegetables during Scalding

(*Continued from page* 190)

within one to two minutes of the commencement of soaking. The scalded weight of a given amount of raw strips was about the same whether the strips had been soaked or not, since the amount of liquid that dripped off soaked strips during scalding was more than off unsoaked strips by an amount approximately equal to the uptake during soaking. (Tables 4 and 5.)

Soluble material from the cut and damaged cells was removed in the wash liquor and therefore less was available for loss during scalding. In spite of this the loss of soluble matter during scalding was greater from washed than from unwashed strips. Large increases in the loss of soluble matter, as a result of soaking, occurred when the fresh material was not fully turgid—*e.g.*, the washed swedes of experiment A. 540 lost two and a half times as much solid matter during scalding as their control; the controls, however, lost little weight on scalding and increased greatly when soaked and so must be regarded as not being fully turgid; the converse is true of swedes of experiment A. 543.

The full effect of washing on the loss of soluble material is only shown when to the increased loss in scalding is added the loss in the wash liquor. With strips of carrot (Table 5) the overall effect of washing was to increase the loss from about 5 per cent. of the dry matter of the raw strips to about 16 per cent., with swede from 4 to 8 per cent. to 15 to 25 per cent., and with cabbage (Table 4) from about 2 per cent. to 12 per cent. There is thus good reason for not washing shredded vegetables before scalding unless it is essential.

(*To be concluded*)

Processing

Two generations ago the first soya beans were brought to America from China and planted in North Carolina. Their value as a source of oil and meal was not at first realised, the beans being sold to children as "bean-shooters."

The growing demand for oil has increased the cultivation of the soya crop until now nearly 800,000 acres are devoted to its production in North Carolina alone. Here is the combine harvester at work.

Soya beans vary considerably in colour, size and chemical composition. Variety, climate, and type and fertility of the soil on which they are grown affect the chemical composition of the bean. On a moisture-free basis, the oil ranges from 14 to 24 per cent. with an average of 19·8, the protein content from 30 to 50 per cent. with an average of 42·9, and the ash from 3·5 to 6 per cent. Only the varieties with yellow seed coats are processed on a large scale.

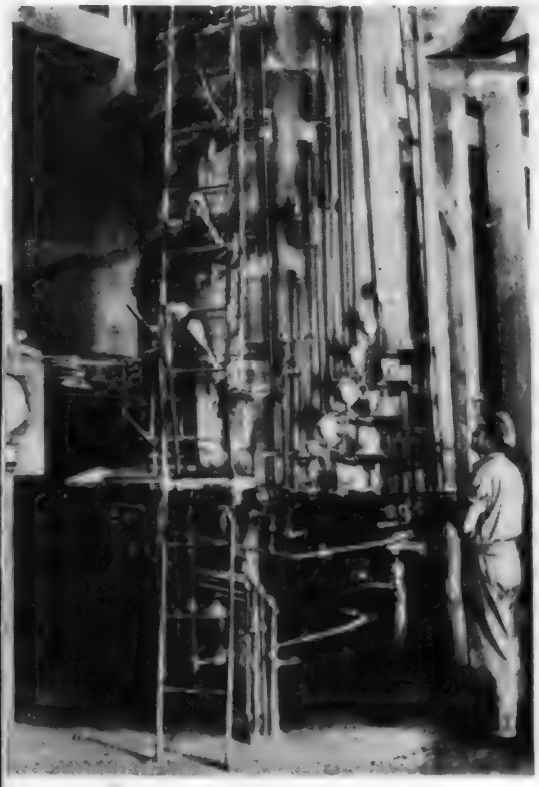
Vitamin B_1 is present in the beans in relatively large quantities, a recent estimate giving nearly 5 I. U. per gram of dry bean. There is reason to believe that there is no serious loss of vitamin B_1 in the manufacture of the flour. The riboflavin content is also appreciable —1·6 μg. per gram—i.e. of the same order as in milk.

Soya beans are shipped and stored in much the same manner as wheat and other grains. Clean cool beans, free from soil and mould, may be stored safely for protracted periods provided the moisture content does not exceed 13 per cent.

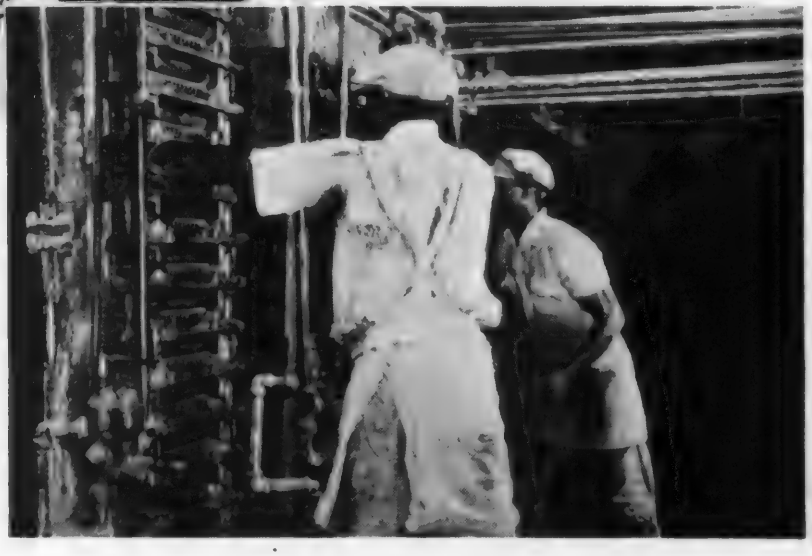
The picture depicts soya beans being taken up chute to hopper, from which they are conveyed through the trough shown on the opposite page.

the Soya Bean

The picture on the right shows the cooker where steam is applied in the processing of the beans.



From the hopper the beans are conveyed through a trough, in which they are cleaned of chaff and dirt by means of a spiral shaft.



Mush from the cooker is pressed, removing the oil, and leaving solids behind.

After crushing, the beans go through rollers to be further refined.

A by-product of oil recovery is meal cake, and here the cakes are being fed into the grinding machinery for meal.

Soya bean oil being transferred to a tanker.

National Flour (80 Per Cent. Extraction) and Bread in Britain

Eighth Report from the Scientific Adviser's Division, Ministry of Food

THE present report covers the two periods June 18 to August 11 and October 8 to December 15, 1945; during this time, 4,334 samples of National 80 per cent. flour were examined. Examination of the samples followed the same lines as described in previous reports on National flour (*cf.* ref. 1); individual samples were examined in respect of colour index (bran speck contamination), granularity, baking quality, vitamin B_1, and *creta praeparata* content, while ash, fibre, *creta*, iron, nitrogen, and nicotinic acid were determined on fortnightly composite samples in which the individual samples were blended according to the size of the mill by which they had been manufactured. (Riboflavin figures have not been included in this survey partly because the microbiological technique, which is the method in general use in these laboratories, has not given consistent results and also because satisfactory agreement with biological methods has not yet been established. The microbiological estimation of nicotinic acid, on the other hand, appears to be generally satisfactory.) National average figures on sample and capacity bases were calculated from results obtained on these composite samples. Data concerning the average composition of the grist used in milling the flour and of the quantities and kind of imported flour admixed were compiled from the information accompanying the survey samples sent by the millers.

TABLE 1

AVERAGE COMPOSITION OF GRIST (CAPACITY BASIS) AND PROTEIN CONTENT OF SAMPLES ANALYSED

Fortnight Beginning—	*Average Composition of Grist.*			*Average Protein Content (Per Cent.) (= N × 5·7).*
	Manitoba (Per Cent.).	*Home-grown (Per Cent.).*	*Plate and other (Per Cent.).*	
Jan. 22	58·5	35·4	6·1*	11·8
April 2	61·2	35·7	3·1	11·9
June 18	56·7	37·1	6·2	11·8
July 2	56·3	36·6	7·1	—
July 16	52·4	38·3	9·3	11·6
July 30	53·8	37·4	8·8	—
Oct. 8	67·1	28·3	4·6	12·0
Oct. 22	74·4	21·8	3·8	—
Nov. 5	76·8	18·7	4·5	—
Nov. 19	76·0	18·8	5·2	—
Dec. 3	77·3	18·8	3·9	12·4

* Including 0·2 per cent. of rye and barley.

Composition of the Grist and Average Protein Content

Since the end of the period covered by the previous report on National flour,[1] the proportion of home-grown wheat in the grist has decreased to half its former value. A temporary increase in the amount of Plate wheat was followed by a considerable increase in the proportion of Manitoba wheat, which now averages 77 per cent. of the total grist. The fluctuations in protein content of the grist closely follow the changes in the proportion of Manitoba wheat, as shown by the data in Table 1.

Addition of Imported White Flour

Approximately 15 per cent. of imported white flour was added at the mill to all National flour manufactured during the period June 18 to August 11. Thereafter the average rate of addition was reduced to 5 per cent. The source of this imported flour was as shown in Table 2:

TABLE 2

SOURCE OF IMPORTED WHITE FLOUR

Fortnight Beginning—	*Average Rate of Addition.*				*Total (Per Cent.).*
	American (Per Cent.).	*Canadian (Per Cent.).*	*Plate (Per Cent.).*	*Australian (Per Cent.).*	
June 18	2·0		12·9		14·9
July 2	2·5	11·9	0·2	0·4	15·0
July 16	1·9	11·9	0·4	0·7	14·9
July 30	1·7	11·3	0·9	1·1	15·0
Oct. 8	0·2	4·4	0·2	0·7	5·5
Oct. 22	0·1	4·4	0·2	0·6	5·3
Nov. 5	0·4	3·9	0·4	0·8	5·5
Nov. 19	0·4	4·1	0·2	0·8	5·5
Dec. 3	0·1	3·9	0·8	0·8	5·6

Colour Index and Granularity

A summary of the colour index (bran speck contamination) data is given in Table 3. The colour index value expresses the speckiness as a percentage of that of an average 85 per cent. National flour (colour index value 100). A flour with a colour index value of 0 would therefore be entirely free from visible bran specks. The speckiness has shown a slight temporary increase during the period under consideration. The fineness of grinding of the flour has remained markedly constant; sifting tests on 1,010 samples examined during the

TABLE 3

SUMMARY OF COLOUR INDEX (BRAN SPECKINESS) DATA

Colour Index not Exceeding—	*Percentage of all Samples Examined in Weeks Commencing—*								
	June 18.	*July* 2.	*July* 16.	*July* 30.	*Oct.* 8.	*Oct.* 22.	*Nov.* 5.	*Nov.* 19.	*Dec.* 3.
5 units	7	9	9	5	5	7	10	10	6
10 ,, ...	29	30	24	21	19	31	32	40	34
15 ,, ...	55	51	42	40	42	52	53	56	59
20 ,, ...	68	67	67	58	67	68	70	75	75
30 ,, ...	80	81	83	79	85	85	84	88	84
40 ,, ...	90	91	93	90	91	92	92	93	90
50 ,, ...	98	97	97	97	97	97	95	97	96
70 ,, ...	100	99	99	99	99	99	99	98	98
Average Colour Index :									
Sample basis	21·3	21·6	22·2	23·8	22·8	21·6	21·1	19·7	21·0
Capacity basis	15·2	15·2	15·9	17·3	17·8	15·6	14·4	13·5	14·2
No. of samples examined ...	243	233	232	232	245	246	247	248	259

last four weeks of the period show that the average percentage weight of the sample which, under standard conditions, does not pass through the No. 10 standard bolting silk is 7·45 per cent. as compared with 7·3 per cent. in the previous period, February 2 to May 5, 1945.[1] The mode, or most frequently occurring value, has, however, decreased from 5·5 to 3·7 per cent., while the range of values encountered (0 to 41 per cent.) is slightly wider.

Vitamin B_1

Fortnightly average values for vitamin B_1, on sample and capacity bases, together with the frequency distribution of the individual values, are shown in Table 4.

Although the National average figure for B_1 is sensibly constant, there is a fluctuation in the vitamin B_1 content of the flour produced by any particular mill; consecutive determinations over a number of weeks showed that for 269 mills the average range of fluctuation was 0·14 I.U./gm. This may be due in part to variation in the vitamin B_1 content of the wheat.

The lowest two values were found in the periods commencing July 16 and July 30, when the percentage of Manitoba wheat in the grist was least. Otherwise there is no correlation between vitamin B_1 content of the flour and the composition of the grist.

Analysis of Fortnightly Composite Samples

The analytical data obtained from the fortnightly composite samples are presented in Table 5. They are corrected for added white flour.

In the report of the Conference on the Post-War Loaf,[2] a recommendation is put forward (par. 32) that flour should contain the following minimum quantities of three token nutrients:

Nutrient.	*Quantity.*
Vitamin B_1	0·24 mgm. per 100 gm.
Nicotinic acid	1·60 ,, ,, ,,
Iron	1·65 ,, ,, ,,

On referring to Tables 4 and 5 above, it will be noted that the National average figures found for vitamin B_1, nicotinic acid, and iron in the period under survey have been 0·234, 1·66, and 1·58 mgm. per 100 gm. respectively.

TABLE 4

SUMMARY OF VITAMIN B_1 DATA

Vitamin B_1 (I.U./gm.) not Less than—	*Percentage of Samples in Fortnightly Periods Commencing—*									*Average for 18 Weeks.*
	June 18.	*July* 2.	*July* 16.	*July* 30.	*Oct.* 8.	*Oct.* 22.	*Nov.* 5.	*Nov.* 19.	*Dec.* 3.	
1·0	1	3	1	1	1	2	2	3	2	2
0·95	2	6	1	2	4	4	3	5	2	3
0·9	15	10	7	4	8	11	7	8	7	9
0·85	26	19	14	9	19	23	23	23	16	20
0·8	46	39	36	27	41	40	38	46	36	39
0·75	70	62	55	59	65	61	64	63	58	62
0·7	85	77	79	87	80	78	81	81	79	81
0·65	93	87	88	96	89	86	92	89	88	90
0·6	98	94	94	98	95	92	97	93	94	95
Average B_1, I.U./gm. :										
Sample basis	0·79	0·77	0·76	0·76	0·77	0·77	0·77	0·77	0·76	0·77
Capacity basis	0·81	0·79	0·76	0·76	0·79	0·78	0·77	0·78	0·77	0·78
No. of samples analysed ...	198	196	199	179	196	217	204	190	188	196
Per cent. of total capacity represented	87	86	88	81	88	91	90	88	87	87

TABLE 5

FIBRE, ASH, CRETA, NICOTINIC ACID, AND IRON IN NATIONAL FLOUR: CAPACITY BASIS (FROM ANALYSIS OF COMPOSITE SAMPLES)

Fortnight Commencing—	*June* 18.	*July* 2.	*July* 16.	*July* 30.	*Oct.* 8.	*Oct.* 22.	*Nov.* 5.	*Nov.* 19.	*Dec.* 3.	*Average for* 18 *Weeks.*
Fibre, per cent.	0·23	0·20	0·17	0·20	0·21	0·19	0·20	0·17	0·20	0·20
Ash, per cent.*	0·72	0·69	0·67	0·70	0·67	0·66	0·63	0·66	0·65	0·67
Creta, oz./sk.	4·6	4·5	5·5	4·9	5·4	5·2	7·1	6·9	7·2	5·7
Nicotinic acid, p.p.m. ...	16·8	16·2	18·0	17·8	15·4	17·0	15·2	15·7	14·9	16·3
Iron, p.p.m.	17·0	15·8	15·9	16·0	15·9	15·3	15·2	15·9	15·4	15·8

* Corrected for added *creta*. The statutory addition of 7 oz. *creta* per 280 lb. sack of flour increases the ash content by 0·12 per cent.

Quality of Bread

Loaves Baked from National Flour Survey Samples.—During the period under consideration, 448 samples of flour were baked under ideal conditions in the laboratory and the resulting loaves judged for volume, colour, and quality of crumb, and were classified as follows:

Quality of Bread.	*Number of Loaves.*	*Per Cent. of Total.*
Good	322	71·8
Fair-good	70	15·6
Fair	43	9·6
Poor	13	2·9

Survey of Commercially Baked Bread.—During the period May 7 to August 31 (when this commercial bread survey ended) 1,016 samples of bread purchased from bakers in different parts of Great Britain have been examined and judged (commercial standards) with the following results:

Quality of Bread.	*Number of Loaves.*	*Per Cent. of Total.*
Good	116	11·4
Fair-good	497	49·0
Fair	304	29·9
Poor	99	9·7

This work has been carried out at the Cereals Research Station, Ministry of Food, St. Albans.

REFERENCES

1 *Nature*, **155**, 717 (1945).
2 Report of the Conference on the Post-War Loaf, 1945. Cmd. 6701. (London: H.M. Stationery Office, 1945.)

Ministry of Food

Latest Statutory Rules and Orders

The list given below is the continuation of the list of Orders published in *Food Manufacture*, April 1, 1946, page 152.

No.	*Date.* 1945.	PRICE FIXATION ORDERS
*1408	Nov. 6.	Canned Puddings (Maximum Prices) Order.
*1409	,, 6.	Order amending the Flour Confectionery (Control and Maximum Prices) Order, 1944.
		* Printed together as one document.
1421	Nov. 7.	Order amending the Poultry (Control and Prices (Northern Ireland) Order, 1943.
1444	,, 14.	Order amending the Fish (Maximum Prices) (No. 2) Order ,1944.
1472	,, 20.	Order amending the Feeding Stuffs (Maximum Prices) Order, 1943.
1473	,, 19.	Sales (Charges) (Amendment) (No. 2) Order.
1493	,, 27.	Potatoes (1945 Crop) (Charges) Order.
1515	Dec. 4.	Order amending the Cheese (Control and Maximum Prices) Order, 1943.
1566	,, 14.	Order amending the Pulse (Control and Prices) Order, 1943.

No.	*Date.* 1945.	DEFENCE (SALE OF FOOD) REGULATIONS
1454	Nov. 16.	Order in Council amending Regulation 3 of the Defence (Sale of Food) Regulations, 1943.
		FEEDING STUFFS
1596	Dec. 19.	Order amending the Directions, dated May 18, 1945, Supplementary to the Feeding Stuffs (Rationing) Order, 1943.
		POINTS RATIONING
1681	Dec. 31.	Order amending the Rationing (Personal Points) Order, 1945.
1682	,, 31.	Order amending the Food (Points Rationing) Order, 1945.
		POTATOES
1511	Dec. 4.	Order amending the Potatoes (1945 Crop) (No. 2) Order, 1945.

Dielectric Heating

POLAR molecules and dielectric problems were the subject of a symposium and discussion at a meeting of the London and Home Counties Section of the Institute of Physics and the London and South-Eastern Counties Section of the Royal Institute of Chemistry.

Dr. S. Whitehead introduced the theoretical ideas associated with the behaviour of dipoles under electrical stress, and showed how the original ideas of Lorentz had been modified by later workers on the subject. Mr. A. J. Maddock, M.Sc., F.Inst.P., gave a historical *résumé* of the practical aspects, commencing with Siemens, 1864, who first observed the heating effects of H.F. energy, followed in 1891 by Tesla, who applied the phenomenon of diathermy. Practical advances, many the subject of patents, were made in U.S.A., France, and Germany, but it was not until 1942-1943 that the commercial use of dielectric heating became available for the thermo setting of plastic resins. Because the dielectric material is heated uniformly throughout the mass, and only thermal loss is suffered at the surface by air cooling, the application of high-frequency heating is now largely employed for the manufacture of laminated boards and shaped laminated pressings. It has possible applications in processes of drying, dehydration, and cooking.

Mr. N. J. L. Mogson, M.Sc., F.R.I.C., gave an account of the constitution of plastics and the effect of polar molecules on their constituents, and explained the changes which thermosetting and thermoplastic materials undergo when they are heated.

Cost of Advertising Branded Foods

THE following memorandum to Council on the cost of advertising as an element of the price of branded foods falling mainly under the "Manufactured Foods Order" of the Ministry of Food has been received from the Advertising Association:

"When branded articles of food, including sauces, pickles, custard powders, and so on, were first made subject to price control by the Ministry of Food in about 1942, the Ministry had to decide whether to call for a reduction in price in respect of advertising costs that could no longer be incurred and which, in some cases, represented a substantial proportion of the retail price. They decided that (*a*) other costs had probably increased and (*b*) it would be difficult and unwise to reduce the standard price which the public had been used to paying.

"In this way the bulk of established proprietary foods have been sold at the pre-war price and the question of the profit margin in relation to advertising economies has not been raised. It is thought probable on balance that many sauce manufacturers have continued to make useful profits, subject, of course, to E.P.T.

"The case which is now apparently raised for the first time is that of a sauce manufacturer who wishes to increase the standard price owing to some increase in overall costs. While the Ministry would continue to allow him to charge the standard price, which includes advertising, they now say that an application to increase the price by, say, 3d. must be justified on a costing basis in which advertising is absorbed in the gross profit. That does not mean that advertising is being disallowed. For example, the standard rate of profit allowed by the Ministry of Food might be 8 per cent. If the manufacturer is now shown to be making a profit of, say, 12 per cent., the Ministry argues that he could absorb his advertising costs, probably reduced as compared to pre-war, in this 'surplus' profit.

"Put another way, if the manufacturer's pre-war proportion of costs were, per bottle, 4d. for raw materials and 2d. for advertising, he must now show that his raw materials cost more than 6d. before he can charge more than the standard price. As long, however, as he continues to charge the standard price, the element of advertising will not be questioned.

"This special compromise represents an exception to the general principle agreed with the Treasury and consistently followed by all Government Departments during the war, which is that no advertising costs should be allowed in official contracts or in fixing maximum prices for standard goods."

Gel-Resistant Zeins

PRESENT-DAY methods of extracting zein from corn gluten give a product which, unless specially treated, has a strong tendency to thicken or gel in storage. The reason, according to the inventors of a new process, is that the 80 per cent. alcohol solution used extracts undesirable floc-forming proteins along with the zein. Removal of these proteins, as well as unwanted colouring matter and oil, has been both difficult and costly. The new process is claimed to reduce markedly the extraction of these impurities by the use of a 40 to 65 per cent. solution of ethanol and water. Another feature of the new process is the treatment of the recovered zein to increase its solubility in various solvents with which it is ultimately to be used. This is accomplished by oxidising the zein in the extract with an agent such as chlorine.

ERRATUM

IN the review of *Poisonous Fungi*, published by King Penguin Books (March, 1946, issue of FOOD MANUFACTURE), the price was given as 2s. 6d. net. instead of 2s. net.

Chocolate Trade and Industry in Egypt

In 1945 Palestine supplied Egypt with 629,000 kilos, valued at £E.134,000, and Britain 49,000 kilos, valued at £E.8,875. During the year 1938 England was Egypt's largest supplier, followed at a considerable distance by Belgium and Italy. In 1942 chocolate was supplied to Egypt by Palestine, Britain, Australia, U.S.A., Canada, and New Zealand; Palestine heading the list with 604,800 kilos and England coming second with 485,200 kilos.

At the present moment Egypt is receiving offers from her usual sources of supply, in particular Britain.

With regard to Palestine, that country tried to establish during the war a market for herself for this product, but though the quality of her chocolate is quite high it was unable to compete with other countries.

Consignments of chocolate are expected from abroad, particularly from England and Switzerland, and it is probable that they will gain their former place on the Egyptian market.

The Egyptian chocolate industry is of comparatively recent date, the first factory being started in 1923, a second factory in 1928, and the last factory to be built dates back to 1935. These factories used all possible means of publicity to popularise their products, but up to the outbreak of war the results were very disappointing. Despite their efforts, the Egyptian manufacturers could not stand up to foreign competition, either on the basis of the quality of their product or the price. In spite of heavy financial sacrifices they did not give up the struggle, and their annual production before the war was estimated at about 1,000 tons. During the war, when Egypt was more or less cut off from her habitual sources of supply, chocolate production rose steeply until it had reached the high level of nearly 3,000,000 kilos a year. This rise was due to the large orders given for chocolate by the Allied forces, who provided the raw material to the firms concerned and reserved for themselves two-thirds of the production, the other third being devoted to civilian consumption.

Production at the present time is estimated at about one and a half million kilos a year, which is greater than pre-war production.

Owing to the quite exceptional circumstances created by the war, the Egyptian chocolate industry has prospered and has emerged from its former precarious position. It remains to be seen whether it will retain this during the period of foreign competition that is now beginning.

One thing that will militate against this is price. Local chocolate costs about double that of the foreign product. Customs duties on imported chocolate (in the region of 33 to 35 per cent.) would be difficult to raise in view of the tendency in favour of the reduction of tariff barriers.

No matter how great the future development of the chocolate industry might be, it would be a mistake to suppose that it would be able to eliminate foreign imports. Certain high-quality brands of chocolates will still continue to be imported. There is room for both local and imported chocolate on the Egyptian market.

Rheology in the Food Industry

Meat research, gelatine jellies, and dairy produce were the subjects of three papers read at a joint meeting of the Royal Institute of Chemistry of Great Britain and Ireland (London and South-Eastern Counties Section) and the British Rheologists' Club on April 2.

Dr. Bate-Smith pointed out that of the many rheological problems in meat research, two are of especial interest. The first is the physical nature of the change which muscle undergoes during *rigor mortis*, which is shown to be due to five- to tenfold increase in the modulus of elasticity of the muscle fibres in a longitudinal direction. The second is the measurement of toughness for the purpose of evaluating quality and measuring the improvement in quality due to conditioning and other "tenderising" processes. Several instruments for measuring toughness were described and illustrated, and the relation between the values obtained and the sensory evaluation of toughness by a consumer were discussed.

After shortly discussing the manufacture and grades of gelatine and the various rheological problems, Mr. R. Drew described simple apparatus for determining in absolute units the elasticity and the plasticity of gelatine jellies. These measurements are of service in determining both the grade and the performance. Shear modulus increases approximately as the square of the concentration, up to 60 per cent. Plasticity is greatest with low jelly strength grades.

Mr. Gaffyn showed that the dairy industry provides considerable scope for the application of rheology. Its products range from milk, which is nearly a true Newtonian liquid, to Parmesan cheese, which is approximately a Hookean solid of comparable hardness to metals. Though an old industry, comparatively little is known about the physical changes occurring in such important manufacturing processes as butter-making and cheese-making. This is in part due to the complexity of the chemical and physical changes which occur, and partly to the absence of testing methods applicable to materials intermediate between Hookean solids and Newtonian liquids. However, at present empirical testing methods are of considerable importance in control and development work within the industry.

Food Manufacturers' Federation, Inc.

REVIEW OF YEAR'S WORK

In the course of his review of the year's work, given at the thirty-third annual general meeting of the Food Manufacturers' Federation, Inc., Lt.-Col. C. V. Jones, C.B.E., who was re-elected President for the third year in succession, referred to the general industrial situation in which this country finds itself. He referred to the prominence which had been given to this in the Prime Minister's appeal and in the recent meetings of Ministers with employers and Labour leaders. At these meetings an appeal was made for national co-operation with the Government and an all-out effort in the grave crisis with which the country is faced. No one doubts that the problems of industrial production in this country for the next few years are as grave as ever have been faced, but in the great crisis at the time of Dunkirk we were given clear and inspired leadership, never belittling the difficulties yet without a tinge of partisanship or faction.

It can fairly be asked if it is possible to produce the right atmosphere for such a production crusade today. On this views may differ, but it is obvious that it cannot be done if unfair attacks continue to be made on employers, on whom the Government proposes to depend for at least 80 per cent. of the national production. It was no use to cast continual reflections on the efficiency of British industry, which its recent war record completely refutes.

Speaking for the food manufacturing industry, Col. Jones said that it has never failed the country yet, and now that the Government again ask for co-operation it will give of its best. But it can only contribute effectively if it is given the real facts and approached in time. He urged the Government most earnestly to afford them the full facts at the earliest possible moment. As far as the Federation was concerned, it has built up an organisation to afford the Government that flexible and expert assistance which from now on it will so much need.

Lieut.-Colonel C. V. Jones, C.B.E.
Elliott and Fry.

Lt.-Col. C. V. Jones, C.B.E., is deputy chairman of Foster Clark, Ltd., managing director of Associated Biscuit Manufacturers, Ltd., deputy chairman of Peek Frean and Co., Ltd., chairman and managing director of Suchard Chocolate, Ltd., and director of Eagle Star Insurance Co. (Maidstone Board). During the war Col. Jones has been chairman of Advisory Committees to the Ministry of Food. He is on the Executive Grand Council and Empire Committee of the Federation of British Industries, and is chairman of their Concentration of Production Committee.

Society of Chemical Industry

The annual general meeting of the London Section will be held in the rooms of the Chemical Society, Burlington House, at 6.15 p.m., on May 6, 1946, prior to the delivery of the paper by A. Lester Smith. The Report for the year ended December 31, 1945, will be considered, and members will be elected to fill the vacancies on the Committee.

Dr. Hugh Nicol

Dr. Hugh Nicol's many friends will be interested to know of his new appointment as Professor of Agricultural Chemistry at the West of Scotland Agricultural College, Glasgow.

B.T.H. New Directors

At the last meeting of the Board of Directors of the British Thomson-Houston Co., Ltd., Mr. H. Jack, Chief Electrical Engineer; Mr. A. A. Pollock, Chief Mechanical Engineer; and Mr. L. J. Davies, Head of the Research Laboratory, were elected Directors of the Company.

The Dispossessed Farmer

An account of bureaucratic control of agriculture exercised through War Agricultural Executive Committees compiled by the Farmers' Rights Association is designed to bring to the notice of the public "specific instances and illustrations of uncontrolled authority in action."

Most of the pamphlet is occupied by accounts of the experiences of dispossessed farmers under the War Agricultural Executive Committees created by the Minister of Agriculture.

The primary objects of the Farmers' Rights Association are: To procure the abolition of the arbitrary power to dispossess held by the Minister of Agriculture and which was originally granted to him for use during war-time only; to give help to the farmer threatened with dispossession; to procure the abolition of the arbitrary power to issue compulsory orders held by the Minister of Agriculture granted also, originally, for war-time use only; to procure the restoration of the constitutional right of appeal to the established Courts of Justice and the restoration of Trial by Jury; immediate right of appeal for all farmers already dispossessed with a view to reinstatement in suitable cases; and finally to obtain compensation similar to that for disturbance under the Agriculture Holdings Act.

Applications for membership of the Association (£1 1s. per annum) may be sent to the Secretary at 4, Shrewsbury Road, Church Stretton, Salop.

Back to Work

Mr. K. Bohemen, a director of Polak and Schwarz (England), Ltd., has now been demobilised from the Netherlands Armed Forces and has resumed full-time activities with the Company.

Electric Vehicles

To those concerned in the use of the electric vehicle for urban deliveries, the booklet issued by Douglas (Kingswood), Ltd., describing the new Douglas (A.C.M.) Electric will be of interest. The booklet contains full information relating to the efficiency and advantages of these vehicles.

Obituary

The death is announced of Mr. Alexander Campbell in Glasgow on March 12. Mr. Campbell was a chemical engineer and senior outside representative for Ernest Scott and Co., Ltd., and George Scott and Son (London), Ltd. Mr. Campbell was widely known in the chemical industry in the North and Midlands.

Mr. Russell James Colman, H.M. Lieutenant for the County of Norfolk and head of the firm of J. and J. Colman, died on March 22, in his eighty-fourth year. Mr. Colman's record of public service was a long and varied one, there being hardly any office of importance that he had not been asked to fill.

Apart from taking a prominent part in guiding the policy of the business of J. and J. Colman and extending its connexions, Mr. Colman was a magistrate for both county and city; Sheriff of Norwich in 1893; Mayor of Norwich in 1901; High Sheriff of the County in 1904; Chairman of the Norfolk County Council 1925-1941; and from 1929 to 1944 holding the appointment of H.M. Lieutenant for Norfolk. During 1889 Mr. Colman was elected to the Norwich City Council. Mrs. Colman and two married daughters survive him. (*Photo: Elliott and Fry.*)

Engineers' Handbook

The current edition of the handbook of the British Engineers' Association is now available and provides a comprehensive list of members and their manufactures. The classified list of manufactures ensures easy reference, and the book is one that all manufacturers should keep at hand.

Frozen Food from Northern Ireland

Frozen foodstuffs are to be transported from Northern Ireland for the first time in cross-Channel vessels.

One, the *Ulster Prince*, formerly the *Leinster*, owned by the Belfast Steamship Co., has already entered service after extensive war work.

Completely reconditioned, the *Ulster Prince* has been equipped with 7,500 cubic feet of cargo space refrigerated for the carriage of all types of food on the Belfast-Liverpool service.

The development is to be followed in the *Ulster Monarch*, of the same line, to be completed by June, and other ships which are now reconditioning. The installation in each vessel will cost £10,000.

Mr. T. H. Fairbrother

Mr. T. H. Fairbrother, M.Sc., F.R.I.C., has been appointed Joint Managing Director of McDougalls, Ltd. He is Director of McDougalls Trust, McDougalls, Ltd., and is chairman of T. Rose Hilton, Ltd., Ashton-under-Lyne.

Purchase of Cider and Pectin Business

Messrs. Webb (Aberbeeg), Ltd., have purchased the old-established business of William Evans and Co. (Hereford and Devon), Ltd., makers of the well-known "Golden Pippin" Cider and "Elpex" Apple Pectin.

The change has been occasioned by the retirement of Mr. Edward Bond, the Senior Director, who has been on the Board of the Company for nearly fifty years. Mr. W. R. Bufton, who has been a Director for nearly thirty years, will continue to direct the affairs of the Company, and remains on the Board as Managing Director.

A joyful crowd greets the return of the banana.

Government Support for B.E.T.R.O.

STATEMENT IN THE HOUSE OF COMMONS

In reply to a question by Mr. Ernest Davies as to what steps the President of the Board of Trade was taking to ensure that U.K. exporters could secure detailed reports on trading opportunities overseas, Mr. Marquand said that he had encouraged them to send their own representatives abroad to study conditions in overseas markets, and that arrangements had been made for His Majesty's Commercial Diplomatic Officers and Trade Commissioners to submit continuous general reports and economic reviews. He had been discussing with the British Export Trade Research Organization how British exporters can be given an all-inclusive overseas service. This demands the use of specially trained technical observers such as are to be employed by B.E.T.R.O.

Discussions between the Board of Trade and B.E.T.R.O have resulted in a working arrangement, and as soon as B.E.T.R.O. have been able to engage the necessary trained personnel for posts abroad and to send out special investigators they will be in a position to provide for their members more detailed reports, which will supplement the general reports which are made by the Commercial Diplomatic Officers and Trade Commissioners. For this purpose they will use the latest scientific fact-finding methods.

To ensure the closest possible working between the Government services and B.E.T.R.O., to avoid duplication of effort, and to give maximum service to its exporters, a joint committee of the Department and that Organization will be set up to review results periodically and to arrange forward programmes.

British Laboratory Ware Association, Ltd.

On the retirement of Mr. S. J. Davies from the Convenership of the Technical Committee of the Association after three years' service, Mr. R. H. Powell has been elected to hold office in his stead.

New Bread Factory

Beattie's Bakeries, Ltd., of Glasgow, have acquired a former linen mill in Kirkcaldy for the manufacture of their bakery products. The establishment of this important bakery unit in the East of Scotland will give a substantial advantage to the firm in the distribution of its products on the east coast route, supplies having been previously drawn from Glasgow.

Boiler Maintenance

Those who have problems connected with steam and power generation, heating, ventilating, and air conditioning will be interested in the range of services provided by J. B. Jackson and Partners.

Advice is given on the efficiency of existing plants and alterations required to obtain economy and maximum output are carried out. Staff capable of running industrial boiler and power plants efficiently and of training clients' personnel in the right methods of operation are available.

The planning and contracting for the installation of complete boiler-house and power-house layouts, heating and ventilating plants, and piping systems for cold and hot water, steam, oil, creosote pitch, and compressed air are undertaken.

Biscuit Supplies

Although de-zoning of the Biscuit Trade came into force on April 29, this does not mean that supplies of biscuits to the public are going to be increased. The labour position is still bad, but the real bottleneck today is the raw material shortage.

While with de-zoning every effort will be made to provide as wide a choice of brands as labour and transport will permit, the total supply of biscuits will continue to be governed by the volume of raw materials and factory labour allowed to the industry.

The co-operation and indulgence of the Distributing Trade is sought during the difficult period of changing over.

Hygienic Bread Delivery

Despite the highest possible hygienic standards in bakeries, where the staff is trained in proper methods of food handling and the bakery designed on lines which ensure perfect cleanliness, on the delivery side there has hitherto been much to be desired. The roundsman has been obliged to carry, with grubby hands, the loaves from van to house door.

Messrs. Parkers' Bakeries, Ltd., branch of Allied Bakeries, Ltd., of Bristol, have solved the problem of handling bread by installing on each electric van an equipment which enables the driver to wash his hands in hot water at least ten times during the round. The equipment is shown in the illustration fitted to a seven-year-old Morrison-Electricar (Crompton Parkinson, Ltd.) 10-cwt. electric van. The two-gallon tank, just inside the driver's cab, is filled with hot water at the beginning of the day, and is specially lagged to keep the water hot for fourteen hours. A compartment is built in the side of the van to hold soap, towel, and basin, which becomes available by opening the hinged panel.

The Canning and Food Industries Club

Members of the Canning and Food Industries Club will be interested to hear that its activities, which were suspended during the war, are proposed to be resumed.

Old members and others interested should communicate with the Secretary, Mr. Charles D. Snell, Beth Label and Wrapper Machines, Ltd., 31-33, Dagmar Road, Finsbury Park, London, N.4.

Adjustable Thermostats

The latest leaflet (AT.10(e)), issued by Sunvic Controls, Ltd., gives details of their adjustable thermostats, types TS and TR, which depend for their operation on the deflection of a bimetal element and are specially designed for operation with Sunvic Hotwire Vacuum Switches. The thermostats are suited to the very accurate control of industrial or laboratory processes operating at temperatures up to 800° C. for the stem type instruments and up to 45° C. for the wall-mounting instruments.

Filling Machinery

Two leaflets published by Valley Products (Lye), Ltd., describe (1) the automatic special type filling machine for powdered and granulated materials such as custard powder, crystals, etc., with a capacity up to 8 oz. and an average speed of forty per minute, and (2) the automatic bottle filling machine for liquids, whereby the placing of a bottle on the spring table starts the flow of liquid which ceases at a predetermined level.

Trusoy

After thirteen years of endeavour to meet demand, the proprietors of Trusoy Soya now find themselves unable to obtain any information regarding future supplies of raw materials.

In the circumstances, British Soya Products, Ltd., feel it would be misleading for them to continue with the advertising of Trusoy for the time being. Disappointing as this decision is, there is every hope that this unhappy condition will be short-lived. As soon as circumstances permit, the policy of distributing Trusoy equably will be restored.

OBITER DICTA

- The final voice of victory is guns, but the first voice of peace is food.—*Mr. Herbert Hoover.*
- We cannot supply fancy nylon stockings, but we can furnish you with a great quantity of dried eggs.—*Dr. Wellington Koo.*
- Anybody who believes that we can get out of our difficulties in two years should go to a lunatic asylum.—*The Home Secretary.*
- At home I am considered a hearty man at the dining table, but among those Soviet men of the soil I am a mere weakling. —*Mr. J. B. Priestley.*
- Gentleman with lard wishes to meet lady with dried egg, with a view to matrimony and a cake.—*Advertisement in "Evening Standard."*
- The picture painted of the future of agriculture is Picasso-like, and it is time something was done to make it a living work.—*Lord Cranworth.*
- Austerity is no fertiliser. What is wanted is the warm sunshine of hope to bring the blossoms and ripen the fruit of honest labour.—*Sir Miles Thomas.*
- There used to be people in London and Glasgow who would sniff at herring. Now they will eat it before they have properly sniffed it.—*Mr. Malcolm Macmillan, M.P.*
- The Minister of Food must know that the whaling season only lasts from December to March, and that whales will not wait while he gets men out under Class B.—*Sir D. Robertson, M.P.*
- I am aware that Service vehicles are very much like Hon. Members of this House, in that it would be a mistake to judge their capacity for work by their external appearance.—*Mr. Dumpleton, M.P., in the House of Commons.*
- In December, when the world was asking for bread, the Minister of Food did not even give us a visible stone; he gave us what looked like a coloured lollipop until it had to be taken out of the shop window.—*Sir Arthur Salter.*
- There is the feeling by those who have seen the New Jerusalem in technicolor during the election, that a new era has dawned, and perhaps high earnings and high wages can still be gained without a high rate of work and effort.—*Mr. Oliver Lyttelton, M.P.*

New Tea Factory

J. Lyons and Co., Ltd., are making their final arrangements for the erection of a new tea factory in Pinetown, South Africa, which it is hoped will be ready for production by the end of the year.

E.M.I. Factories, Ltd.

Among the new factories recently formed by Electric and Musical Industries, Ltd., is E.M.I. Factories, Ltd., who will be responsible for the operation of the whole E.M.I. manufacturing network. In addition to the production of television and other appliances, the organisation is deeply interested in the development of electronic, photo-chemical, and chemical processes, some of which have wide industrial applications.

Advertising in Trade and Technical Press

With a view to assisting their members to make discriminative purchases of advertisement space, the British Engineers' Association have issued a "Guide for Members" embodying the pertinent points issued by a Joint Committee of the Association and the British Electrical and Allied Manufacturers' Association, supported by the Incorporated Society of British Advertisers, Ltd.

The Guide indicates, among other things, the nature of the journals best suited for advertising. The editorial and general contents should cover a clearly defined field and the title of the journal should be indicative of this.

The front cover should be occupied by a high-grade illustration or attractive layout in two or more colours.

Stress is laid on the editorial contents, in which should be included authoritative articles on specialised subjects; reprints of, or abstracts from, papers of particular interest, read before members of learned Societies, in so far as they come within the defined scope of the journal; articles of new designs, materials and production methods, equipment, etc.

Among further details considered are: list of contents, make-up, page size, the advisability of the regular insertion of two- or three-colour advertisements, and special issues.

Mashed Potato Powder

FORMATION OF NEW COMPANY

A new company has been formed under the title of M.P.P. (Products), Ltd., with an authorised capital of £500,000, to take over from Chivers and Sons, Ltd., the world rights of their business of manufacturing and selling mashed potato powder, produced under a process for which patents have been applied.

The shares in M.P.P (Products), Ltd., are held by Reckitt and Colman, Ltd., and Chivers and Sons, Ltd. The directors of the company are: Sir Basil Mayhew (chairman), Mr. J. S. Chivers, Mr. S. Oswald Chivers, Mr. W. B. Chivers, Mr. Basil Reckitt, Mr. H. A. G. Salter, and Mr. G. M. Samuelson.

Mashed potato powder (which must not be confused with dehydrated potato) has, since 1942, been produced by Chivers and Sons, Ltd., in very large quantities for the sole use of the Services. It is expected that during 1946 a proportion of the output will be available for sale to the public.

The product will continue to be manufactured at Montrose, Scotland, and Newry, Northern Ireland. Chivers and Sons, Ltd., are the production managers, and Reckitt and Colman, Ltd., the selling agents for the product in the United Kingdom.

Supplies of potatoes are at present being obtained through the Ministry of Food. When control is removed it is the company's intention to make contracts with growers through the usual channels.

The formation of this company may have an important effect on the future of Norfolk farming. Last year Norfolk grew some 36,000 acres of potatoes, compared with an average of about 24,000 acres before the war. There is little likelihood that once the world food shortage is over the present acreage will be maintained without a big demand for manufacturing purposes.

So far as labour requirements are concerned, potatoes have the great advantage over sugar beet that the crop can be handled almost from start to finish by machinery.

Cow and Gate

The directors of Cow and Gate, infant food manufacturers, announce that Treasury consent has been obtained to the issue by the company of its unissued 200,000 seven and a half per cent. Cumulative Preference shares of £1 each and 4,005,976 Ordinary shares of 1s. each.

It is learned that the price of the Preference shares will be 32s. and the Ordinary 3s. 6d., so that well over £1,000,000 of new money will be provided. The Preference are being offered in the proportion of one in three and the Ordinary of one in two. The Ordinary are quoted at 5s. 1½d. and the Preference at 37s. 9d.

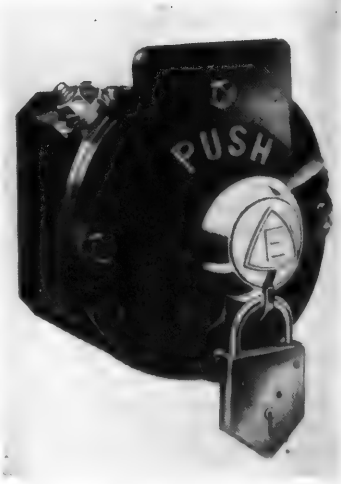
Bovril

The full report of Bovril confirms that the rise of £171,200 in profits (before tax) to £641,000 for the past year was due to a considerable increase in sales. Liquidation of emergency war reserves contributed to that expansion—it was also reflected in a reduction of £231,400 in stocks—but it will not escape the notice of stockholders that export sales, already above the 1939 figure, are only 20 per cent. short of the record. Further, Bovril has now re-entered markets in practically all countries. It is in that way that the narrowing margins of profit consequent on the impact of rising costs on pre-war selling prices have failed to be reflected in the total profit.

Refractometers

An illustrated booklet describes several different kinds of refractometers and their uses.

These hand-type refractometers made by *Optique et Précision de Levallois* of Levallois-Perret (Seine) are of three types: (1) graduated from 0 to 35 per cent. for fruit juices, pulps, etc., (2) graduated from 20 to 55 per cent. for tomato concentrates, and (3) graduated from 40 to 80 per cent. for jams, etc.



Emergency Push Switch

H.M. Factory Inspectors are insisting that in all cases where an electric motor has to be stopped from remote points the emergency or trip switches must be hand resetting and that provision should be made for padlocking them in "trip" position. The new Ellison Emergency Switch meets this requirement. A single blow on the push knob opens or closes a trip coil circuit, which remains "operated" until the switch is reset by hand. Provision is made for padlocking the push knob either "on" or "off."

When it is desired to instal a self-resetting switch, the switch can be readily converted from hand-resetting to self-resetting by removing a small spring from the ball catch mechanism.

The switch is rated at 5 amps continuous at 660 volts and is single pole double break. Two sets of contacts are provided, and they can be connected for independent circuits or they may be linked together to give a single two-way combination.

Change of Name

The name of the Incorporated Association of Purveyors of Light Refreshments has now been changed to Caterers' Association of Great Britain. The official organ of the Association, the P.L.R. Bulletin, has also been renamed, and will in future be known as Caterers' Association Bulletin.

Mission to South Africa

U.K.'s BID FOR EXPORT

Representatives of commerce and industry in Port Elizabeth heard authoritative accounts of the rebirth of Britain's peacetime industries and her determined bid for supremacy in the export markets of the world when they met the two members of a specialised mission from the United Kingdom.

The mission, which consisted of Mr. E. H. Gilpin, chairman of the Food Machinery Industrial and Export Group, and Mr. N. Neville, the Group's Director, is the first of its kind to visit the Union, and its members presaged further similar missions to South Africa in the future.

Mr. Gilpin said that a mere goodwill message would not go very far. It should be vitalised by a mutual understanding. Mutual understanding must be established and, wherever it exists, maintained. They wanted to know South Africa's needs and requirements and to see how mutual help could be given in the days that lie ahead.

Today British factories have turned from tanks to tractors, but the change is not yet complete. Skilled men are still only filtering back to their jobs, although every day the position gets better and output increases. That output is going, in as fair a distribution as can be devised, to the export markets of the world.

Mr. N. Neville, in reviewing the recent programmes of the British Government and the consultation with the Board of Trade over production, said that Britain must export over 70 per cent. in volume more than she exported before.

He then dealt with technical advances in biscuit and baking machinery, brewing plant, mineral water, canning, chocolate and sugar confectionery machinery, flour mills, and dairy equipment, and said that indulgence was asked in time only. As for design, it was hoped to beat the world.

Mr. W. A. Willoughby Frye, speaking for the South African Chambers of Commerce and Industry, said that they appreciated the sacrifice made by Great Britain during the war, but the part played by South Africa must not be forgotten. In doing this industries have been developed many of which helped to ease the strain of production overseas.

As loyal South Africans their duty was to South Africa first. But in supporting their own industrial development their desire to assist Great Britain would be met by all the orders she could handle for machinery and the raw materials their industries required.

Mr. Willoughby Frye went on to say that they had been considerably perturbed by the views expressed on the reduction or abolition of the imperial preference—an important factor in the export of South Africa's primary products. It could not be overlooked that the loss of imperial preference might force South Africa to reconsider its marketing policy overseas.

He did not want to stress this aspect of trade relations, but had no doubt that it would receive the consideration it deserved.

Food Supplements from Yeast

"Nothing but benefit could result from a partnership between scientific investigation and the ancient arts," said Dr. I. A. Preece, lecturer in biochemistry and botany in the Heriot-Watt College, Edinburgh. He was giving some account of the studies that had been made on the constituents of barley and hops, showing the relationship between such studies and problems met with in the utilisation and cultivation of these brewing materials. As an example of the manner in which discoveries in one field almost inevitably lead to advances in another, he cited the recent investigations into the reproduction of yeast, leading to the development of new yeast races which might prove of particular industrial value as agents of fermentation or as food supplements. Dr. Preece was lecturing to the Royal Scottish Society of Arts in Edinburgh on "Some Aspects of Brewing and Fermentation Science."

Mr. Rowland Arnison

Mr. Rowland Arnison, Managing Director of Short and Mason, Ltd., is shortly leaving for the United States and Canada.

The purpose of his visit is to investigate modern industrial instrument development, and at the same time to renew contact with established trade in these countries. Further development of export trade will also form a big part of Mr. Arnison's programme.

Trade News from Cairo

A note of warning to British manufacturers interested in export markets is sounded in a letter from our correspondent in Cairo. He comments upon the negative tone of the letters to prospective buyers in Egypt. He further states that although it is known that British manufacturers cannot supply goods yet, they often display a curt tone in their mail giving the impression that they care nothing for the Egyptian market either now or in the future, although there are many exceptions, especially among manufacturers of proprietary lines.

The markets are being bombarded by the Americans, whose prices are consistently lower than British quotations.

Ice Cream in Glasgow

Anybody who on demobilisation thought of entering the ice cream trade in Glasgow would be well advised to consult the food inspectors of the Corporation Public Health Department before buying premises, said Mr. A. M. Stewart, chief food inspector of the department, to members of the ice cream trade at a meeting in Glasgow under the auspices of the Ice Cream Alliance.

This was advisable, he added, because Glasgow was one of the few places in Britain where the regulations applying to the manufacture and sale of ice cream were the same as those in force for dairies.

Professor James P. Todd, of the Royal Technical College, Glasgow, who also addressed the traders, urged them to impose their own standards of sterilisation within the trade, if possible in advance of any imposed by the local authority.

Dehydration Developments in U.S.A.

Orange juice, concentrated to one-eighth its normal volume but still retaining the essential vitamins, is canned.

Two-pound blocks of compressed carrots, enough to serve fifty people, are heat-sealed in vapour-proof cellophane wrappers.

Swamps into Orchards

The draining of the malarial Colchis marshes, in the Georgian Soviet Socialist Republic, has converted this district into one great orchard. Cultivation of tea, grapes, tobacco, and fruits has reached a high level.

Jam Manufacture by Solar Energy

The heat rays of the sun have been successfully harnessed in Russia by means of a "sun machine" tested in a jam factory. The sun's rays were focused by a mirror 33 feet in diameter and used for heating a water-filled boiler for making steam. The production of much larger machines is being planned.

The inventor is Dr. Federico Malero, a Spanish engineer, who has made his home in Russia, where he has spent many years studying the harnessing of solar energy.—*Reuter.*

Solid Orange Juice

Orange juice by the pound is now available to the American housewife. Citrus Foods, Inc., of Los Angeles, freezes orange juice, seals it in cellophane bags, and packages it for distribution in a fibreboard carton.

New Frigorifico for Brazil

The construction of a new frigorifico has begun near Tupancireta, Rio Grande do Sul, according to the President of the Meat Institute of Rio Grande do Sul, which is sponsoring the project. The frigorifico, which is to be completed in two years' time, is to have a daily slaughter capacity of 1,000 head.

The industrial buildings will consist of a slaughterhouse, warehousing facilities, a building for the preparation of meat for *charque*, sausage, and edible fats, cold-storage chambers large enough to store 3,000 metric tons of frozen meat, storage facilities for hides, salt and brine tanks, a tower for the treatment and reprocessing of brine, and a building for the bundling of *charque*, in addition to administrative and laboratory quarters. — *Reuter's Trade Service.*

Electronic Blancher

A suggestion that an electronic blancher be developed to facilitate the preparation of frozen vegetables at locker plants was made by Mr. F. S. Burroughs, of the Newton (N.J.) Food Company, in an address to the second annual frozen food conference at Rutgers University.

The process of blanching vegetables prior to freezing has long been a handicap in their preparation, Mr. Burroughs said, and the development of an electronic blancher would be of great aid to operators of locker plants. He also suggested that it might be possible to cook food at the plant, thereby preparing it for the table as well as for the stove.—*Reuter's Trade Service.*

Ministry Announcements

Food Mission in Australia

With the appointment of Mr. Bankes Amery as the United Kingdom representative on the British Phosphate Commission, the Ministry of Food loses his services as Head of the United Kingdom Food Mission in Australia. The question of the appointment of a successor is under consideration, as the Ministry of Food feel that, in the present circumstances of shortage of so many essential foods, it is important to maintain the closest possible contact with supplying countries overseas.

Export Promotion Department

As a result of the Department of Overseas Trade (Dissolution) Order, 1946, made on March 20, the Department of Overseas Trade ceased to exist as a separate department at the end of March. From April 1 its functions were taken over by a newly formed Export Promotion Department of the Board of Trade, to which the staff of the Department of Overseas Trade has been transferred.

Mr. H. A. Marquand, who was the Secretary of the Department of Overseas Trade, became an additional Parliamentary Secretary to the Board of Trade with the title of Secretary for Overseas Trade.

It is intended that, as soon as circumstances permit, the Export Promotion Department should be housed with the rest of the Board of Trade Headquarters. Meanwhile they will remain at the present address of Department of Overseas Trade, and correspondence and enquiries formerly sent to that Department should be addressed to the Board of Trade, Export Promotion Department, 35, Old Queen Street, London, S.W.1. Telephone: Victoria 9040.

As was explained by the Prime Minister in a statement made on December 17, 1945, the object of the new arrangements is to improve the services which the Government can render to overseas trade. The new Export Promotion Department will continue to afford all the facilities for exporters previously available in the Department of Overseas Trade.

Home-Grown Wheat in Bread Grists

The proportion of home-grown wheat used by millers in all areas for grists for bread-making flour was limited on March 18 to an amount not exceeding 10 per cent.

An exception has been made in the case of mills of less than ten sacks an hour capacity situated in rural areas and drawing their supplies from local sources. These mills are permitted up to a maximum of 20 per cent. home-grown wheat in bread grists.

Restrictions on Delivery

The restrictions on the wholesale and retail delivery of bread and flour confectionery were withdrawn from March 31.

Bakers who wish to take advantage of this decision to offer improved delivery services must themselves be prepared to meet the additional cost involved. The Minister is unable to regard the provision of such improved services as essential, and any extra costs incurred will not therefore rank for the payment of the Bread Subsidy.

Labelling of Table Jellies

An Order has been made authorising for a limited period the sale of table jellies under labels which do not conform to the requirements of the Labelling of Food (No. 2) Order, 1944. This licence will apply to all sales of table jellies by the packer or labeller prior to January 1, 1947.

Export of Biscuits

During the past two months it has been possible for biscuit manufacturers to export limited quantities without obtaining individual export licences.

Following discussions between the Board of Trade and the Ministry of Food, however, this relaxation has been withdrawn (S.R. & O. 1946 No. 366).

From March 20, it again became necessary to obtain an export licence before exporting any type of biscuit.

Compound Feeding Stuffs

The Feeding Stuffs (Regulation of Manufacture) Order, 1944, has been amended with effect from March 18, 1946. The amending Order modifies the specifications for National Compounds consequent upon the reduction in the amount of wheat by-products which will be available as a result of the increased flour extraction rate. The principal alteration is a reduction in the minimum wheat by-products content of all National Compounds and an increase in the minimum cereal content of National Cattle Foods and National Poultry Foods other than National Baby Chick Food; the maximum fibre content is slightly increased. In addition, the composition of National Cereal Mixture is altered by increasing the cereals content and reducing the percentage of wheat by-products.

Artificial Insemination

With the increasing availability of air transport for civilian purposes the Minister of Agriculture and Fisheries has decided, in the interests of the British livestock industry, to control the importation and exportation of bull and stallion semen, and the purposes for which imported samples are used. The Minister has, therefore, made the Importation and Exportation of Semen and Imported Semen (England and Wales) Regulations, 1946. Applications to move bull or stallion semen between England and Wales and places outside of Great Britain should be made to The Secretary, Ministry of Agriculture and Fisheries (Livestock Improvement Branch), Block 4, Bickenhall Mansions, London, W.1. The Secretary of State for Scotland has made similar Regulations applicable to Scotland.

Much has yet to be learned of the effect on animal semen of long-distance transport, including methods of packing and handling. It is proposed, therefore, to limit the issue of licences for the time being to samples to be despatched or received for approved research and experimental purposes.

Food Gift from New Zealand

SIR BEN SMITH THANKS MR. PETER FRASER

Sir Ben Smith, the Minister of Food, has sent the following personal message of thanks to Mr. Peter Fraser, Prime Minister of New Zealand, for the gift of food which he offered us on behalf of the Dominion during his recent visit to London:

"I have been considering how best to make use of the gift of food which, on behalf of the New Zealand Government, you made to the United Kingdom Government during your recent visit, and I should like again to express our deep gratitude for this generous gesture.

"You were so good as to indicate that the foodstuffs would be at our disposal for use where we think they will be most needed. The gift consists of a great number of items. Certain of them we feel will be most useful in India—viz., the whole milk powder, the malted milk, and the Service type biscuits. These we have offered to the Indian authorities, who have accepted them with gratitude, and the necessary shipping arrangements are being put in hand. A part of the dehydrated vegetables will be needed in Malaya. We feel that it would be best for all the remaining items to be shipped to this country. The sausages, canned peas, canned tomatoes and tomato *purées*, and possibly other items will be a welcome addition to our food supplies in the United Kingdom and will be valued, too, as one more token of New Zealand's sympathy and helpfulness in times of difficulty. As regards the substantial quantity of processed vegetables, the war-time increase in production of potatoes and other fresh vegetables in the United Kingdom has been so great as to make additional supplies of most types of dehydrated or canned vegetables unnecessary for civilian consumption. Arrangements are being made for most of the processed vegetables to be used for relieving distress in European countries.

"May I again thank you most cordially for this gift and for the continued efforts of New Zealand to assist in overcoming the grave and world-wide shortage of food supplies, which I fear will continue to face us during these coming months."

Edible Oil

A new Order has been made amending the Edible Oil (Control of Sales) Order, 1944. The amendment makes it clear that any oil or fat used for the purpose of greasing tins, trays, etc., is edible oil within the meaning of the Order and may not be obtained by, or supplied to, trade users except under the authority of a buying permit. No permits will be granted for lard oil or hog grease for cooking or tin greasing, as the Ministry regards these fats as undesirable for use in the manufacture or preparation of human food.

The Minister of Food also points out that oil or fat used for putting a film on dough, etc., so as to obviate the necessity for greasing tins, is used in the preparation of human food and is, therefore, edible oil as defined in the Order.

Flour Confectionery Orders

An Order consolidating the Orders relating to flour confectionery came into force on April 1 and removes the restriction on retail deliveries.

British Food Mission in Ottawa

Mr. J. L. Croome, Resident Head of the British Food Mission, Ottawa, is leaving Canada to return to the Ministry of Food in London. He will be succeeded by Sir Andrew Jones, C.M.G.

Eggs from Denmark

The Ministry of Food has concluded an agreement with Denmark for the delivery in 1946 of 500,000 cases of eggs, in all 180,000,000 eggs, to the British market. To supply this quantity Denmark will restrict the number of eggs available for its home market.

Maximum Prices for Table Jellies

An Order has been made fixing Maximum Prices for table jellies from March 31, 1946.

"Table Jellies" include table jelly compounds intended to be made up with milk and known by various trade names, as well as table jelly tablets and table jelly crystals made up with water. The products all contain a substantial percentage of sugar and are in uniform packets to make up to 1 pint of table sweet, with the exception that, under special licence, table jelly crystals may be sold in bulk packs of 7 lb. or multiples of 7 lb. to Institutions, Catering Establishments, etc. As already announced table jellies will be subject to Points Rationing.

Four sets of maximum prices are scheduled controlling sales by retail, sales by wholesale, and first-hand sales for each of four product types. Details are given in S.R. & O. No. 384 dated March 23, 1946.

One example of the Save Bread Campaign.

Information and Advice

Lemon Marmalade

B.856. *Should lemon marmalade be boiled in a copper preserving pan in view of the strong acid content of the lemon? Also information on how to make the best kind of lemon marmalade as regards colour and taste.* (Northern Ireland.)

There is no objection to the use of copper pans for the manufacture of lemon marmalade. Copper is of high resistance against corrosion and acid, but only while hot; it is, therefore, essential to empty the pans immediately the jam is boiled. Pulp must never be left in cold copper pans.

The usual procedure for a factory-manufactured lemon marmalade is as follows:

The lemons are quartered and the juice extracted. An orange pulping machine of the plunger type is suitable, otherwise the juice has to be extracted by hand. It is also advisable to move part of the pith to avoid excessive bitterness. The peel is then cut and boiled until soft. The juice may either be used in its natural state, or it can be filtered if a more transparent marmalade is required. The juice and the cooked peel are then mixed. A recipe based on 68·5 to 70 per cent. of soluble solids is as follows:

Lemon pulp	48 lb.
Sugar	78 lb.
Soluble Lemon Oil	1 oz.
Water	15 lb.

This gives an output of 120 lb. of finished marmalade.

Information Supplied

B.711. *Recipes and the uses of pure malt extract of high sugar content and rich in diastase for use by bakers, confectioners, etc.* (Eire.)

B.712. *Suppliers of Cellophane paper for wrapping parcels consisting of 6 × 1 lb. jam jars and manufacturers of the appropriate machinery; also suppliers of machinery for removing stones from cherries.* (Hereford.)

B.713. *Manufacturers of the following machinery: (1) two-roller steel type mill; (2) copper extractors; (3) vacuum concentrators.* (Beirut.)

B.714. *Names and addresses of manufacturers of machinery for the making of macaroni.* (Greece.)

B.715. *Names and addresses of suppliers of Irish Moss.* (Essex.)

B.716. *Suppliers of carrageen or similar seaweed products.* (Middlesex.)

B.717. *Name of manufacturers of Crisp Bread.* (London.)

B.718. *Details of production of potato crisps and suppliers of the necessary equipment.* (Derbyshire.)

B.727. *Information relevant to the canning of tomato purée.* (Lancs.)

B.728. *Commercial recipe for baking powder.* (Sussex.)

B.734. *Details of production of potato crisps and suppliers of the necessary equipment.* (Yorks.)

B.735. *Names and addresses of firms making plastic-lined tanks.* (Somerset.)

B.736. *Information in respect of the use of Karaya in farinaceous and other products.* (London.)

B.740. *Manufacturers of machinery for peeling onions.* (Lincs.)

B.741. *Titles, authors, and publishers of books dealing with commercial pickling, factory lay-out, equipment, etc.* (Warwicks.)

B.742. *Makers of equipment for piling 1/4 Dingley lids, for the automatic supply of lids for the double-seaming machine in a sardine cannery, and manufacturers of splitting machines for kippers.* (Norway.)

B.748. *Recipes, equipment, and plant for packeting roasted, salted peanuts.* (Newcastle.)

B.749. *Recipes for the manufacture of blancmange and custard powders, and self-raising flour.* (Malta.)

B.750. *Information on the following subjects: (1) sage and onion stuffing; (2) baking powder, etc.; (3) pudding and cake mixtures.* (London.)

B.762. *Particulars of firms specialising in the manufacture of modern machinery for the processing and canning of tomatoes and fruit pulps.* (Spain.)

B.765. *Suppliers of jam jar closures.* (Holland.)

B.769. *Particulars regarding the manufacture of macaroni.* (India.)

B.771. *Information relevant to the use of sodium sulphite for the purpose of bleaching and crisping cauliflowers and other vegetables.* (Worcs.)

B.783. *Names and addresses of manufacturers of a Babcock electric centrifuge.* (London.)

B.785. *Information on the preservation of fish by the use of ethyl and propyl gallate, together with name and address of suppliers of these chemicals.* (Staffs.)

B.787. *Yields of concentrated orange juice and bottler's base per ton of oranges.* (South Africa.)

B.797. *Names of the committees dealing with the erection of the proposed new beet sugar factories.* (Norway.)

B.798. *Manufacturers of machinery for shelling green peas.* (Yorks.)

B.799. *Names and addresses of suppliers of mustard powder.* (Surrey.)

B.800. *Particulars of prices paid for dried whites and yolks of eggs, and also for whole eggs (whites and yolks homogenised and dried together).* (Denmark.)

B.801. *Suppliers of certain machinery displayed at the Radio Heating Exhibition.* (Belgium.)

B.802. *Information on the commercial process of manufacture, storage, and distribution of predigested protein foods.* (London.)

B.804. *Suppliers of a reconditioned electric confectionery mixer, capacity 40 quarts.* (Eire.)

B.814. *Name of machine used in the manufacture of vermicelli (coralettes) for cake decoration, and suppliers of same.* (Lancs.)

B.815. *Manufacturers of a non-returnable hygienic milk bottle.* (Lancs.)

B.816. *Names and addresses of manufacturers of evaporators.* (Eire.)

B.823. *Manufacturers of nut-treating machinery.* (South Africa.)

Recent Patents

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents," and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Specifications Published

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

574,200. JOB, A. J.: Tool for opening bottles and cans.

574,207. ANDERSON, A. T. FRIIS—., and MURCH, W. R.: Apparatus and method for drying disintegrated foodstuffs, grain, and the like.

574,262. LINDLEY, F. C.: Devices for the production of solid frozen comestibles from syrups and like liquids.

574,374. FITCH, W. E., and ROBERTS, G. M.: Construction of tins, containers, and the like opened by the removal of a disc in one end of the tin by a cutter incorporated in the lid.

574,387. UNITED FRUIT CO., and ROBSON, H. H.: Refrigerating system.

574,389. BETTER, E., and PALESTINE OIL INDUSTRY SHEMEN, LTD.: Process of manufacturing a foodstuff.

574,436. LYONS AND CO., LTD., J. and SNELL, A .W.: Root vegetable cutting machines.

574,437. HARBER, L. S., and BAKER PERKINS, LTD.: Means for delivering flour or other powdered material.

574,464. BRITISH THOMSON-HOUSTON CO., LTD.: Refrigerating machines.

574,807. WILLIAMS, W. P. (Procter and Gamble Co.): Process for altering the composition of fats and fatty oils for food and other purposes.

574,904. BORG, E. M.: Method of canning fish and the meat of other sea foods.

Abstracts of Recent Specifications

Improvements in Machines for Peeling Vegetables

This invention relates to machines for peeling vegetables and more particularly potatoes and carrots, such machines being of the type comprising revolving abrasive wheels constituting the bases of compartments through which the vegetables (hereinafter for convenience termed potatoes) pass in succession.

The object is to provide an improved arrangement or disposition of the abrasive rollers which simplifies the drive thereto and assists in propelling the potatoes from compartment to compartment.

The group of abrasive rollers which constitute the base of each compartment of the machine is arranged so that a circle struck from a centre in the axis of the driving pulley or wheel for such group will pass through or in proximity to the axis of each roller. It is possible therefore to use a single chain or belt to drive each group of rollers and a single adjustment means can be provided to make the necessary adjustment of the chain or belt tension.

The known type of machine is separated into compartments by dividing plates with a gap between the end of each plate and a side wall for the progress of the potatoes through the machine. The said gaps are staggered so that the potatoes travel back and forth successively through the several compartments. In this machine the dividing plates are located above the axes of uppermost rollers at the base of each compartment so that such rollers act to transfer the potatoes through and out of the compartments as well as to peel the potatoes.

571,184. Mather and Platt, Ltd., and Thomas Marsden Jones.

Trade Marks

The list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal" and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

THE THREE BEARS. — 635,092. Sugar confectionery (not medicated), not being bakers' confectionery or biscuits. **Co-operative Wholesale Society, Ltd.**, 1, Balloon Street, Manchester; Wholesale Dealers and Manufacturers.

PEX.—635,869. Nut butter. **Rowntree and Co., Ltd.**, The Cocoa Works, Wigginton Road, York; Manufacturers and Merchants.

OATOVA.—636,026. Oat flour. **The Caledonian Milling Co. (Aberdeen), Ltd.**, Caledonian Mills, Palmerston Road, Aberdeen; Millers and Grain and Produce Merchants.

TWINKLETTES. — 636,070. Cake decorations made principally from cereals. **White's Sugar Mills, Ltd.**, Albion Street, Driffield, Yorkshire; Grinders and Merchants.

New Companies

Brooms Pie Specialists, Limited. (400630.) 59a, Taff Street, Pontypridd, Glamorgan. To carry on bus. of manufacturers of and dealers in meat pies, sausages, brawn, etc. Nom. cap.: £1,000 in £1 shares. Dirs.: Mary A. Broom, 59a, Taff Street, Pontypridd, Glamorgan; Anetta Jenkins, 5, Kincraig Street, Cardiff.

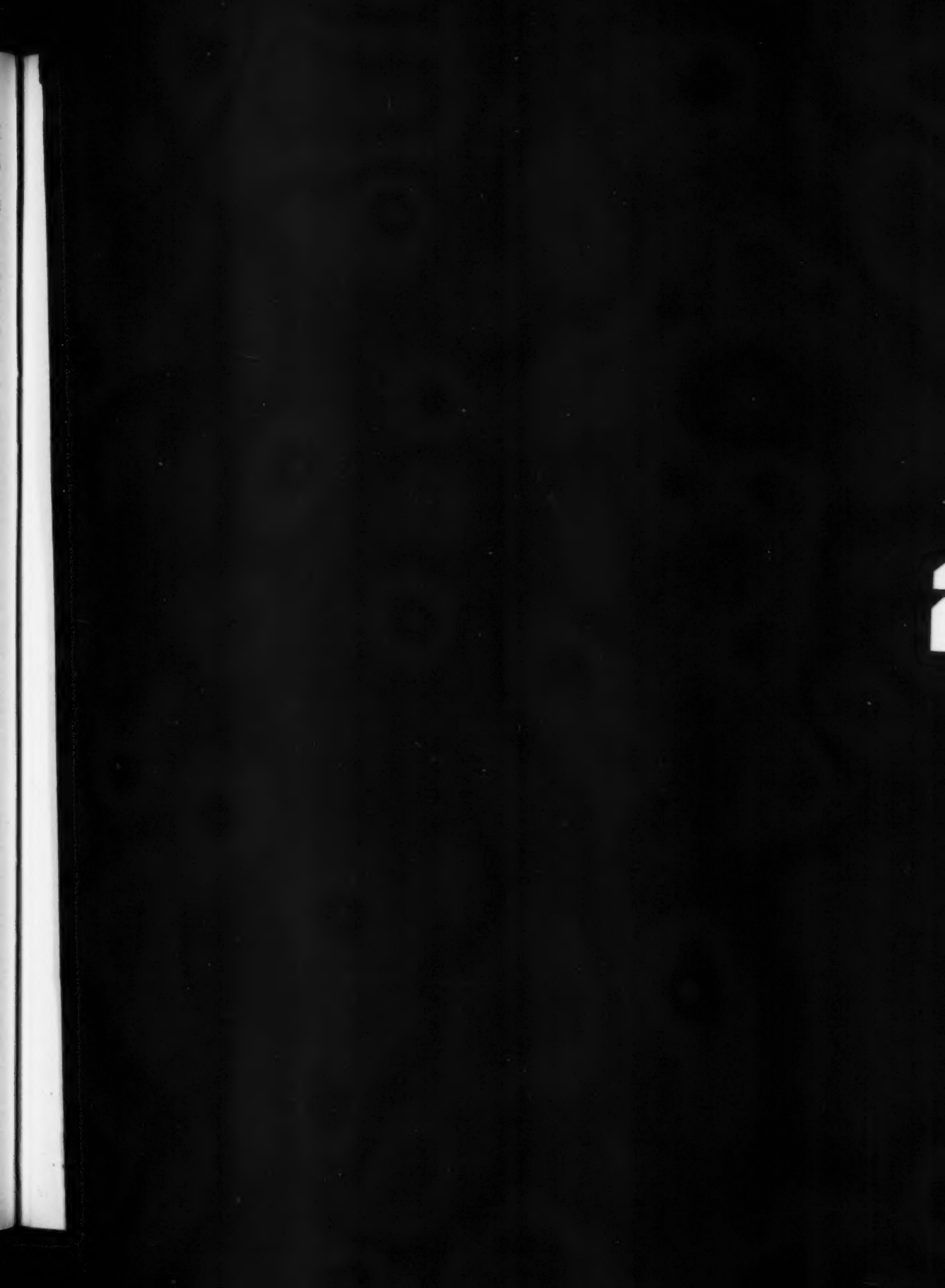
Aminacet, Limited. (400751.) 95a, Chancery Lane, W.C. To carry on bus. of manufacturers of and dealers in foodstuffs, alimentary yeast, protein, amino acid, and vitamin preparations, etc. Nom. cap.: £500 in 5s. shares. Dirs.: Dr. M. Sulzbacher, 168, Haverstock Hill, N.W.3; H. C. Medlam, M.A., 95, Chancery Lane, W.C.2; B. I. Weizmann, 11, Grove Court, Drayton Gardens, S.W.10.

Anglo-Greek Enterprises, Limited, (400893.) Bevis Marks House, E.C.3. To carry on bus. of dealers in fresh, dried, tinned, or otherwise preserved fruit and vegetables, etc. Nom. cap.: £5,000 in £1 shares. Dirs.: I. B. Bullen, 35, Arlington House, Arlington Street, W.1; F. W. Standley, 3, Overmead, Sidcup, Kent; X. L. Messinesi, 88, Yale Court, Honeybourne Road, W. Hampstead, N.W.6.

Frosticles, Limited. (400914.) 255, High Street, Lincoln. To carry on bus. of manufacturers of and dealers in frozen fruit, iced confections, etc. Nom. cap.: £2,000 in £1 shares. Dirs.: D. F. Scott, 8, The Avenue, Lincoln; F. C. Lindley, 151, Carholme Road, Lincoln.

Walter Greaves (Export), Limited. (401018.) 7, Battery Green Road, Lowestoft. To carry on bus. of herring buyers, packers, and exporters, etc. Nom. cap.: £300 in £1 shares. Dirs.: M. W. Greaves, 7, Battery Green Road, Lowestoft; P. P. Phillips, Summerrods, Hexham; H. E. Johnson, 4, Carr Lane, Willerby, E. Yorks.

White, Cottell and Co., Limited. (401352.) 143, Neate Street, Camberwell, S.E.5. To carry on bus. of dealers in and merchants and factors of foodstuffs of all kinds, etc. Nom. cap.: £100,000 in £1 shares. Dirs.: H. W. Port, 44, Christ Church Road, East Sheen, S.W.14 (permt. gov. dir. and ch.); J. C. Milburn, 36, Half Moon Lane, Herne Hill, S.E.24; W. J. White, "Teviotdale," Station Road, Burgess Hill, Sussex.

Cornish Canners, Limited. (403258.) 25, Newman Street, W.1. To carry on bus. of fishermen, dealers in fish and fish products, etc. Nom. cap.: £1,000 in £1 shares. Dirs.: to be appointed by subs. Subs.: Ethel M. Hubbard, 69, Dresden Road, N.19 (secy.); Mrs. M. O. Gould, 76, Hervey Close, Finchley, N.3.

Taken from the Daily Register, compiled by Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C. 2.